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Eventide Avionics
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Maintenance Manual

ARGUS 3000, 5000, 7000

Moving Map Display

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The information in this manual has been reviewed and is believed to be entirely reliable, however, no responsibility is assumed for any inaccuracies. Contents of this Manual are subject to change without prior notice.

Additional Copies of this manual may be purchased for $50.00, prepaid and postpaid.

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Conventions in This Manual

This manual presents certain information in the form of WARNING, CAUTION, and NOTE statements. The information contained in these statements is too important to be left in the regular text where it might be overlooked. These statements are intended to be easily identified. The format of each is illustrated below, with an explanation of the kind of information that type of statement contains.

WARNING

WARNING statements warn the user about certain conditions or practices which could result in physical harm.

CAUTION

CAUTION statements identify conditions or practices that could cause damage to the ARGUS or to other equipment.

NOTE

NOTE statements call attention to specific information.

Section 1
GENERAL

1.1 Purpose

The purpose of this manual is to guide you in simple repair of the Argus models 3000, 5000, and 7000, or in updating the unit's database and/or operating system. This manual also provides information regarding adjusting the screen display.

Repairs or updates to the Argus are limited to replacement of the following:

* Database board in models 5000 and 7000
* Database/operating system in model 3000 (four ROM chips on CPU board)
* Operating system in models 5000 or 7000 (one or two ROM chips on CPU board)
* Internal lithium battery in models 5000 and 7000 (on CPU board)
* Shorting Plug Jack in models 5000 and 7000 (on CPU board)
* Central Processing Unit (CPU) board
* Daughter board (also called small power supply board)
* 3-amp fuse (on mother board, also called main power supply board)
* ON/OFF switch assembly
* Key caps

The information in this manual helps you to identify which board or component might need replacing.

This manual is designed to be used by a qualified installation center, and is not normally intended for use by the Argus owner or operator.

1.2 Before You Begin

Read all instructions thoroughly before beginning any procedure described in this manual. Be sure you have the proper tools and sufficient time to complete the task before beginning.

WARNING

Repairs to these instruments should only be performed by qualified personnel. Do not attempt any repairs not described in this manual.

NOTE

When removing screws from the Argus, it is very important to note the position of each screw. The screws are purposely different sizes. It is imperative that they are replaced in their original positions.

The 7000 is designed so that the database board can be replaced without removing the unit from the aircraft. The key caps can also be replaced while the unit is still mounted in place. For all other repairs and replacements, the Argus must be first be removed from the aircraft.

1.3 Anti-Static Precautions

Follow standard anti-static precautions when repairing the Argus or handling the circuit boards. Static electricity can be very damaging to the electronic components that make up the Argus. It is important to have a clear, clean work space. A conductive surface is best to avoid picking up static charges.

Keep the part to be replaced in its anti-static packaging until you are ready to install it into the Argus. Make sure any tools you will be using are also clean and free from metal particles.

Begin work only when you have the time to go through the entire procedure without having to get up to move around. Get yourself comfortable in one spot. Before you open the Argus or the package containing the replacement part, touch a grounded piece of metal with one hand, and while you are still grounded, touch the Argus, the replacement part's package, and your tools with the other hand. This will discharge all the static charges before you start. You should also touch the grounded metal briefly every few minutes.

1.4 What To Replace

The part that will probably be replaced most often is the database. This information is updated by Eventide Avionics every 56 days (or every 28 days for the international database). Argus models 5000 and 7000 units which are FAA approved for IFR with IFR approved Loran C, GPS, or Navigation Management Systems *must* be updated every 56 days.

In the models 5000 or 7000, the database is located on the database board. When updating the database, the entire board is replaced.

In the model 3000, the database is contained in four Read Only Memory (ROM) chips on the CPU board, along with its operating system. All four chips must be replaced at the same time.

The ordering part numbers for all field-replaceable parts are listed in Table 1. These parts can be ordered by calling Eventide at (201) 641-1200.

The parts that are DEFINITELY NOT field-replaceable, are the mother board (main power supply board), Cathode Ray Tube (CRT), front panel bezel, and the deflection yoke. If any of these need to be replaced, return the entire unit to Eventide Avionics for repair. CONTACT EVENTIDE FOR RETURN AUTHORIZATION BEFORE RETURNING THE UNIT.

When returning an Argus for any reason, always include a note describing the problem in detail and giving the name and phone number of someone familiar with the problem. This will allow us to repair the unit in the least time and at the least expense.

The Argus 3000 Reference Manual and the Argus 5000 & 7000 Installation Manual each contain a trouble shooting section which can be useful in solving problems. Some of the information is repeated in Section 4, along with additional information, to help you determine which component or board might have to be replaced.

Table 1. Ordering Part Numbers.

Description	Part Number
Database board (model 5000)	103002
Database board (model 7000)	103022
Database/operating system ROM (model 3000)	*
Operating system ROM (model 5000 or 7000)	5200-03 or -02
Lithium battery	105003
Shorting plug	312113
Shorting plug jack	315016
CPU board (model 3000)	103017
CPU board (model 5000 or 7000)	103001
Daughter board	103005
3-amp pico fuse	316019
ON/OFF switch assembly (specify Argus model when ordering)	300167
ENR Key cap	422057
ARR Key cap	422058
DEP Key cap	422059
AUX Key cap	422060

* The ordering part number for the operating system depends on your current and new versions. Call Eventide for proper part number.

1.5 Different Models

The three Argus models may require different steps to replace similar boards or components. A separate description is given for each model when necessary.

Models 3000 and 5000 look the same from the outside. Inside they are very similar, but the 5000 has an additional board for its database. (The 3000's database is located in a set of ROM chips on the CPU board.) The 5000 needs more circuitry because of its ability to interface with other equipment. This takes up room on the CPU board. The 5000's database is also larger, and more chips are required to store the database.

The 7000 can almost be thought of as a 5000 turned on its side. The top and bottom panels of the 7000 are similar to the right and left panels of the 5000. One major difference in the design of the two units is the positioning of the database board. The 7000's database board is exchanged from the front of the unit, and can be replaced without removing the 7000 from the aircraft. To remove the database board in the 5000, you must first remove the unit from the aircraft and then remove the right side panel to get to the board. Another difference is the transfer board in the 7000, which interfaces the database board to the CPU board.

Both the 5000 and 7000 contain a lithium battery, which energizes the internal clock when the unit is off. The 3000 does not have this battery, since it does not display time.

Section 2
DATABASE REPLACEMENT

2.1 General

Eventide Avionics creates a new database every 56 days (every 28 days for the international database).

There are also several *versions* of the database, with different levels of detail. Changing to a more detailed version is an upgrade. The identification plate reflects the current status and must be replaced whenever the database is upgraded. The procedure describing how to replace the identification plate is in Sub-section 3.5.

Be sure to return the old database board to Eventide Avionics. If the database was upgraded, also return the old identification plate.

Separate instructions are given for each model and procedure.

NOTE

When removing the screws, take note of their location, as it is important that they be replaced correctly.

2.2 3000 Database Replacement

The 3000's database and operating system are stored on four ROM chips (U2, U3, U29 and U30) on the CPU board. The database and operating system are updated in the same procedure. This procedure is described in Sub-section 3.2.

2.3 5000 Database Board Replacement

To update the database in the model 5000, replace the database board (part #103002).

Necessary Tools: Small phillips head screwdriver

Remove The Old Database Board

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the database board.

2. Two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and

wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

Insert The New Database Board

3. Remove the replacement database from its protective packaging.

4. Align the pins on the replacement board with the connectors on the CPU board. Gently push on the database board until the pins are seated as far as they will go.

5. Position the side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

6. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, recheck the installation of the database board.

2.4 7000 Database Board Replacement

To update the database in the model 7000, replace the database board (part #103022). You can replace the board without removing the 7000 from its rack in the aircraft.

Necessary Tools: Small phillips head screwdriver

Remove The Old Database Board

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

Insert The New Database Board

2. Remove the replacement database board from its protective packaging.

3. Gently insert the replacement board into the enclosure slot with the ROMs facing up. Apply pressure until the board engages the rear connector and the handle is flush with the bezel.

4. Tighten the two phillips-head screws to secure the database board into position.

5. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, recheck the installation of the database board.

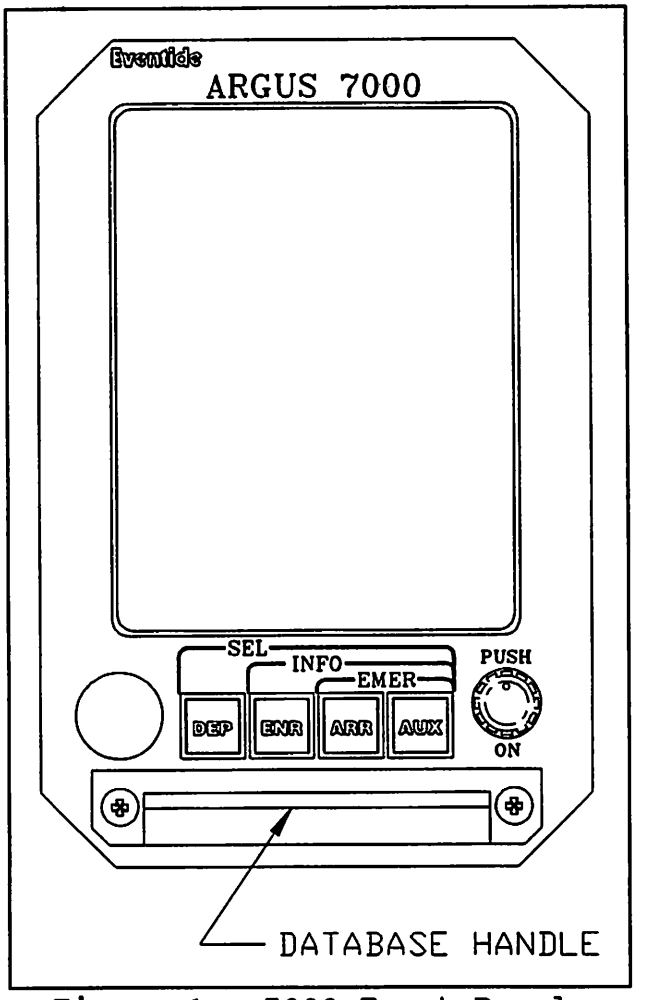

Figure 1. 7000 Front Panel.

Section 3
OPERATING SYSTEM REPLACEMENT

3.1 General

The operating system ROM(s) are serialized. The serial number provides important information about the particular Argus in which the ROMs are installed. The serial number displayed on the screen when the unit is first powered on MUST match the serial number on the identification plate on the rear cover. **DO NOT interchange ROMs from one unit to another.**

In the model 3000, the database and operating system are updated in the same procedure. Models 5000 and 7000 require separate procedures for updating the database or operating system. Separate instructions are given in Sub-section 3.5 for replacing the identification plate.

NOTE

When removing the screws, take note of their location, as it is important that they be replaced correctly.

Be sure to return the old board or chips to Eventide Avionics, along with the old identification plate.

3.2 3000 Database/Operating System Replacement

The 3000's database and operating system are stored on four ROM chips (U2, U3, U29 and U30) on the CPU board. It is important that all four chips in the Argus be from the same set. Do not mix the replacement chips with the ones being replaced. To replace the ROMs, you must first remove the CPU board.

Necessary Tools: Small phillips head screwdriver
Slot-head screwdriver (for removing ROM chips)

Remove The CPU Board

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the CPU board.

2. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the top cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

3. The rear cover is connected to the CPU board. Slowly pull the rear cover out of the unit housing until the CPU board is exposed approximately 1-1/2 inches.

4. A ribbon cable connects the solder side of the CPU board to the power supply board. Disengage this connector and slide the CPU board completely out of the unit's housing.

5. On the rear cover there are two pan-head screws, located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

Remove The Old ROMs

6. The location of the ROM chips on the CPU board is illustrated in Figure 2. Note the orientation of the ROMs. Remove one chip at a time by gently slipping the very end of the slot-head screwdriver under one end of the chip and twisting the screwdriver. Then slip the screwdriver under the other end of the chip and twist again.

CAUTION

Do not push the screwdriver blade in so far that it can touch the surface of the printed circuit board or you may damage the board.

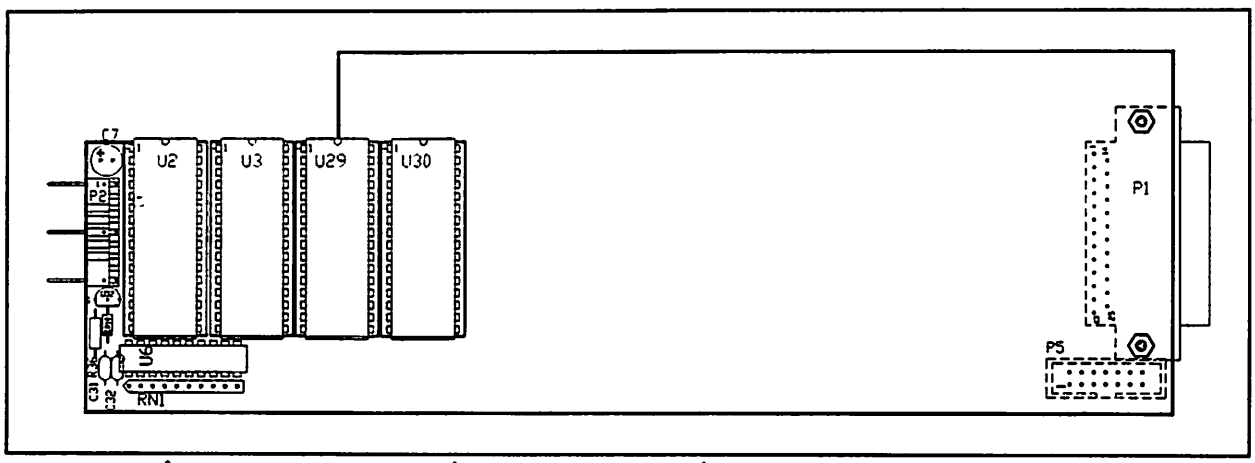

Figure 2. Location of ROM Chips on 3000 CPU Board.

Insert The New ROMs

7. Remove the new set of ROMs from their protective packaging. Note the labeling on the chips and the proper placement for each chip as indicated in Figure 2. Also note that each ROM has a small notch on one end. Orient the ROMs as previously noted.

CAUTION

Failure to insert ROM chips in the correct orientation will damage the ROMs. Do not assume that the labels are in the right direction. You must orient the ROMs with the notch.

8. Insert the ROMs, one chip at a time as follows:

   a) First place the pins on one side of the chip into the contacts on one side of the socket. DO NOT PUSH DOWN YET.

   b) Next center the pins on the other side of the chip in the contacts on that side of the socket. Some side pressure may be necessary.

NOTE

Make sure that none of the pins are bent under the chip and that none are outside the socket. If this happens, remove the chip, straighten the pins and try again.

New ROM chips are often made with their pins splayed out from the centerline of the device. If the pins are splayed so far that gentle side pressure is not enough to center the pins in the socket before pushing, it may be necessary to bend the pins. The easiest way to do this is to push each side of the chip against your work surface until the pins are parallel.

   c) When ALL the pins are into the openings in the socket, push down firmly on the center of the ROM chip until all the pins are seated as far as they will go.

Reassemble The Argus

9. Reconnect the rear cover to the CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

10. Insert the CPU board into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the CPU board into the slot formed by the top and bottom covers until about one inch of the board is exposed.

NOTE

You may encounter some resistance when the board gets to the deflection yoke. Just keep pushing gently but firmly until the board moves.

    b) Insert the ribbon cable into the connector on the solder side of the board. Hold the ribbon cable against the solder side of the CPU board and push the board all the way in.

c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

11. Secure the rear cover in place with five flat-head screws.

12. Position the side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

13. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, recheck the installation of the ROM chips.

3.3 5000 Operating System Replacement

The 5000's operating system is stored in two ROM chips (U2 and U3) located on the CPU board. It is important that both ROM chips are from the same set. Do not mix the replacement chips with the ones being replaced. Argus 5000 CPU boards with serial numbers greater than XX3XXX or with part numbers 5000-2x-xx have CPU boards with only one ROM. Please refer to section 3.6 for information on replacing it.

Replace the ROMs while the CPU board is still in the unit housing.

Necessary Tools: Small phillips head screwdriver
Slot-head screwdriver (for removing ROM chips)

Remove The Database Board

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the database board.

2. Two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

Remove The Old ROMs

3. The location of the ROM chips on the CPU board is illustrated in Figure 3. Note the orientation of the ROMs. Remove one chip at a time by gently slipping the very end of the slot-head screwdriver under one end of the chip and twisting the screwdriver.

4. When the end of the chip has come part way out of the socket, slip the screwdriver in further and twist it again. Repeat this step until the chip pops loose.

CAUTION

Do not allow the screwdriver to touch the pins at the end of the ROMs.

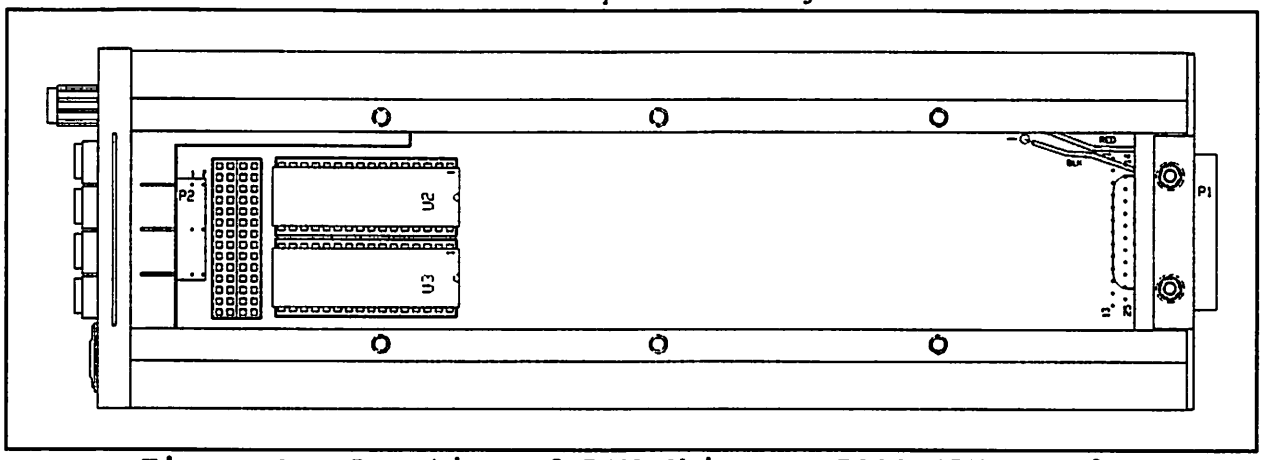

Figure 3. Location of ROM Chips on 5000 CPU Board.

Insert The New ROMs

5. Remove the new set of ROMs from their protective packaging. Note the labeling on the chips and the proper placement for each chip as indicated in Figure 3. Also note that each ROM has a small notch on one end. Orient the ROMs exactly as noted previously.

CAUTION

Failure to insert ROM chips in the correct orientation will damage the ROMs. Do not assume that the labels are in the right direction. You must orient the ROMs with the notch.

6. Insert the ROMs one chip at a time as follows:

a) First place the pins on one side of the chip into the contacts on one side of the socket. DO NOT PUSH DOWN YET.

b) Next center the pins on the other side of the chip in the contacts on that side of the socket. Some side pressure may be necessary.

NOTE

Make sure that none of the pins are bent under the chip and that none are outside the socket. If this happens, remove the chip, straighten the pins and try again.

New ROM chips are often made with their pins splayed out from the centerline of the device. If the pins are splayed so far that gentle side pressure is not enough to center the pins in the socket before pushing, it may be necessary to bend the pins. The easiest way to do this is to push each side of the chip against your work surface until the pins are parallel.

c) When ALL the pins are into the openings in the socket, push down firmly on the center of the ROM chip until all the pins are seated as far as they will go.

Reassemble The Argus

7. Align the pins on the database board with the connectors on the CPU board. Gently push on the database board until the pins are seated as far as they will go.

8. Position the side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

9. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, recheck the installation of the ROM chips.

3.4 7000 Operating System Replacement

The 7000's operating system is stored in two ROM chips (U2 and U3) located on the CPU board. It is important that both ROM chips are from the same set. Do not mix the replacement chips with the ones being replaced. Argus 7000 CPU boards with serial numbers greater than X72XXX or with part numbers 7000-2x-xx have CPU boards with only one ROM. Please refer to section 3.6 for information on replacing it.

To replace the ROMs, you must first remove the CPU board.

Necessary Tools: Small phillips head screwdriver
Slot-head screwdriver (for removing ROM chips)

Remove The CPU Board

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1 on page 6 of this manual.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

2. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the right cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

4. The rear cover is connected to the CPU and transfer boards. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the power supply board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws, located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

7. The transfer board is attached to the CPU board by a connector on the end of the board nearest the front panel of the unit. Pull the transfer board from the CPU board using a gentle rocking motion.

Remove The Old ROMs

8. The location of the ROM chips on the CPU board is illustrated in Figure 4. Note the orientation of the ROMs. Remove one chip at a time by gently slipping the very end of the slot-head screwdriver under one end of the chip and twisting the screwdriver.

9. When the end of the chip has come part way out of the socket, slip the screwdriver in further and twist it again. Repeat this step until the chip pops loose.

CAUTION

Do not allow the screwdriver to touch the pins at the end of the ROMs.

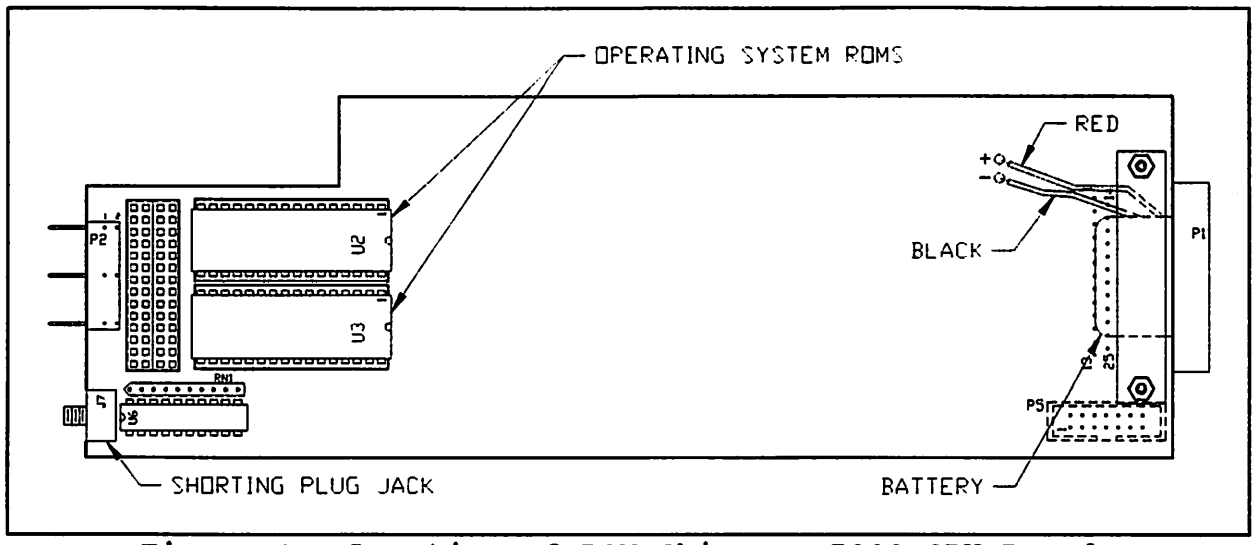

Figure 4. Location of ROM Chips on 7000 CPU Board.

Insert The New ROMs

10. Remove the new set of ROMs from their protective packaging. Note the labeling on the chips and the proper placement for each chip as indicated in Figure 4. Also note that each ROM has a small notch on one end. Orient the ROMS as previously noted.

CAUTION

Failure to insert ROM chips in the correct orientation will damage the ROMs. Do not assume that the labels are in the right direction. You must orient the ROMs with the notch.

11. Insert the ROMs, one chip at a time as follows:

    a) First place the pins on one side of the chip into the contacts on one side of the socket. DO NOT PUSH DOWN YET.

    b) Next center the pins on the other side of the chip in the contacts on that side of the socket. Some side pressure may be necessary.

NOTE

Make sure that none of the pins are bent under the chip and that none are outside the socket. If this happens, remove the chip, straighten the pins and try again.

New ROM chips are often made with their pins splayed out from the centerline of the device. If the pins are splayed so far that gentle side pressure is not enough to center the pins in the socket before pushing, it may be necessary to bend the pins. The easiest way to do this is to push each side of the chip against your work surface until the pins are parallel.

    c) When ALL the pins are into the openings in the socket, push down firmly on the center of the ROM chip until all the pins are seated as far as they will go.

Reassemble The Argus

12. Position the transfer board over the CPU board and line the pins of the transfer board with the connector on the CPU board. Press firmly on the transfer board until the pins are seated as far as they will go.

13. Reattach the rear cover to the CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

14. Insert the transfer and CPU boards into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the boards into the slots formed by the right and left covers until about one inch of the boards is exposed.

    b) Insert the ribbon cable into the connector on the solder side of the CPU board. Hold the ribbon cable against the solder side of the CPU board and push the boards all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

15. Secure the rear cover in place with five flat-head screws.

16. Gently insert the database board into the enclosure slot and apply pressure until the board engages the rear connector and the handle is flush with the bezel.

17. Tighten the two phillips-head screws to secure the database board into position.

18. Position the bottom panel in place and secure it with the ten flat-head screws (eight 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5. The two red screws are attached to the front panel bezel.

19. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, recheck the installation of the ROM chips.

3.5 Identification Plate Replacement

The identification plate is replaced in a simple two-step procedure.

1. Remove the old identification plate from the rear panel.

2. The new identification plate is self adhesive. Peel off the paper from the back of the new plate, position the plate on the rear panel, and press firmly to attach.

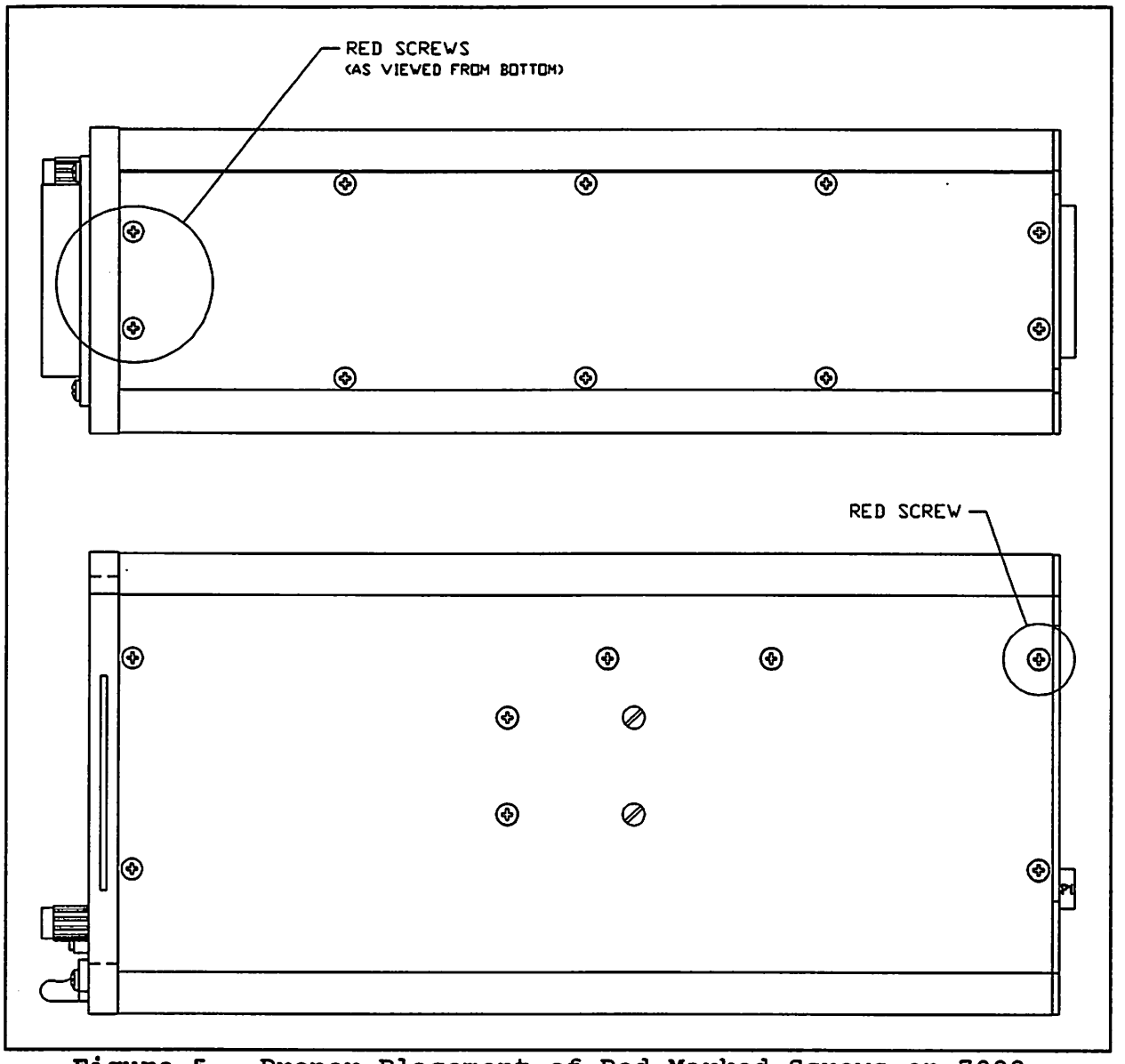

Figure 5. Proper Placement of Red-Marked Screws on 7000.

Place the old identification plate and the old ROMs or board in the packaging that the new ROMs or board came in. This must be returned to Eventide.

3.6 Operating System ROM replacement on newer 5000/7000 CPU boards

In July 1993 Eventide phased into production a new CPU board with a single ROM socket. The earlier boards held a maximum of 128K of operating system code. The new, single socket can hold a ROM with up to 512K, allowing room for code expansion. In order to install operating system 4.0 or greater, the CPU with this socket is necessary. If the customer has an Argus with the appropriate CPU board, the operating system upgrade may be field-installed following procedures in this section.

If a customer wants to upgrade from the old CPU to the new CPU so that he can install new versions of the software, the Argus must be returned to Eventide for upgrade. The upgrade involves a CPU board exchange, and parts from the old CPU are used on the new one. The unit must be re-tested and re-documented.

All instructions in sections 3.4 and 3.5 remain applicable except for those involving the physical handling of the ROM itself. The ROM is installed in a PLCC socket and the procedure for removing and replacing it is detailed below. A PLCC socket extraction tool (Textool Part No. 4-0000-06230-002-099-000) or equivalent is required.

1: Follow the instructions in section 3.4 (Argus 5000) or 3.5 (Argus 7000) to render the ROM accessible.

2: Note the orientation of the ROM while it is in its socket. The beveled edge is to the right when the board is oriented as shown. Eject the ROM using the removal tool by inserting the hooked probes into the corners and gently squeezing the handle until the ROM pops out of the socket.

3: Place the new ROM on top of the socket. **CAREFULLY OBSERVE THE ORIENTATION OF THE BEVELED EDGE.** Do NOT rely on the label for proper orientation. Press down on the ROM until it is fully seated in the socket.

4: Follow the instructions in section 3.4 (Argus 5000) or 3.5 (Argus 7000) to re-assemble the unit and change the identification plate.

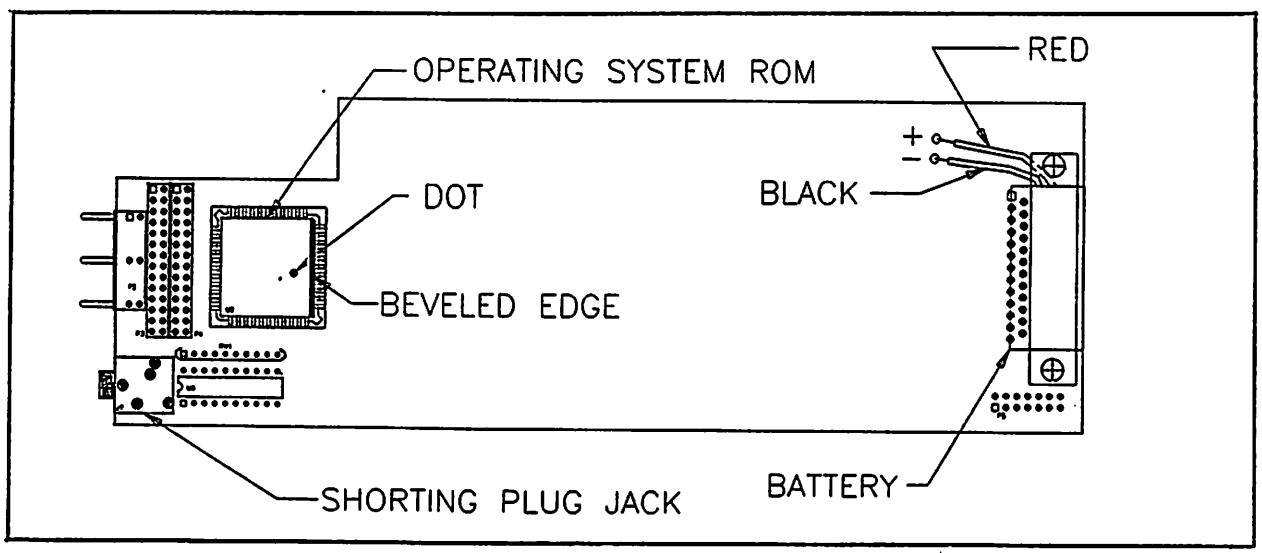

Figure 5a. ROM location on single-ROM CPU boards.

Section 4
TROUBLESHOOTING

4.1 General

The Argus performs a series of self-diagnostic tests each time the unit is powered on. The sequence is as follows:

1) The RAM is tested.
2) The vector table and RAM areas are initialized.
3) A message is displayed on the screen.
4) The operation of the DUART and its crystal is checked.
5) The interrupt operation is tested.
6) The system ROMs are CRC'ed.
7) The real-time-clock is tested (5000 and 7000 only)
8) The A/D converter is checked (5000 and 7000 only)
9) The data base ROMs are CRC'ed
10) The non-volatile RAM is checked.

During the self-test routine, the unit displays a "first" disclaimer. To view the progress of the self-tests, press any button while this disclaimer is displayed.

When the unit has finished its self-test routine, the screen displays a listing of the tests that have passed. If all tests have passed, the Argus initializes the main program.

4.2 If Any Tests Fail

If any of the tests fail, the units stops, or "hangs up," leaving an error message displayed on the screen.

If the RAM test fails, the failed address, expected data, and found data are displayed.

If one of the ROM areas fails to CRC, the "correct" CRC and the calculated CRC are displayed.

If the non-volatile RAM fails to checksum, the unit will not hang up. Instead, it will warn the pilot that the defaults may be invalid and should be reset in the amend and set-up modes immediately. It will then wait for a key stroke before proceeding to the initialization routines.

If one of the other tests fails, an error status code is displayed to indicate what part of the test failed. These codes are listed in Table 2. Table 2 also lists some possible other errors and their probable causes.

When the system hangs up and an error message is displayed, press and hold the ENRoute button, then the AUX button (reverse of the INFO sequence). The unit displays the processor state at the time of the failure. If the shorting plug was installed during the self test, an additional push of reverse INFO will cause the unit to bypass the failure and go straight to the disclaimer page.

Table 2. Status Error Codes

STATUS CODE or ERROR	DESCRIPTION	FIX
0 EXCEPTION FAILURE	An exception has occurred. This is catastrophic and no other data is available.	Replace CPU board.
1 DUART ERROR	Counter Ready bit in DUART Status register could not be cleared.	Replace CPU board.
2 DUART ERROR	Interval timer in DUART is not running.	Replace CPU board.
3 IRQ ERROR	The Interrupt was asserted before the Heartbeat occurred.	Replace CPU board.
4 IRQ ERROR	The interrupt did not occur when the Heartbeat occurred.	Replace CPU board.
5 CLOCK FAILURE	The real time clock was not running during the test because the internal battery to the clock IC is bad.	Replace the battery.
6 CLOCK ERROR	The real time clock was running too fast.	Replace CPU board.
7 A/D CONVERTER FAILED	The A/D did not finish a conversion (A/D EOC) in time.	Replace CPU board.
8 A/D CONVERTER FAILED	The A/D did not start a conversion or finished too fast.	Replace CPU board.
9 A/D CONVERTER FAILED	The A/D read more than $02 when reading 0 volts, unipolar.	Replace CPU board.
10 A/D CONVERTER FAILED	The A/D read more than +/-$02 when reading 0 volts, bipolar.	Replace CPU board.
11 A/D CONVERTER FAILED	The A/D input did not read between 0.28 and 0.39 volts when testing the cassette output, unipolar.	If failure occurs with the shorting plug inserted, the shorting plug is bad. if the failure occurs without the shorting plug inserted, replace the shorting plug jack.
12 A/D CONVERTER FAILED	The A/D reading varied by more then +/-2 when reading the cassette output, unipolar.	Replace CPU board.
13 A/D CONVERTER FAILED	The A/D reading varied by more the +/-2 from the unipolar reading when reading bipolar.	Replace CPU board.
14 INTERRUPT ERROR	An interrupt occurred which was not anticipated.	Replace CPU board.

Table 2. Status Error Codes (continued)

STATUS CODE or ERROR	DESCRIPTION	FIX
SYSTEM ERROR	Normally appears with an exception code followed by numbers.	Contact Eventide for assistance. Be sure to note exception code numbers.
Unit fails to power up when turned on.	Buttons and screen are not illuminated. The internal fuse is open.	Determine cause and replace internal fuse.
Unit displays bright vertical or horizontal line, or just a dot on the CRT and lasts for more than a few seconds.	There is a problem with the display circuitry.	TURN THE UNIT OFF IMMEDIATELY! Return to Eventide for repair.
Ranges will not increment or decrement properly in some modes of operation.	CPU board/Front Panel switch Berg contacts shorted to CRT coating. If CRT is not damaged: If CRT is damaged: CPU board Berg contacts not engaging front panel.	 Remove CPU board and trim pins. Return unit to Eventide for repair. Remove CPU board and straighten contacts
ARGUS pages through various screens sequentially, and won't stop at any one screen.	If the front panel switch berg was just replaced, then the pins weren't trimmed close enough to the board.	Remove the CPU board to trim the pins.

Section 5
BATTERY REPLACEMENT

5.1 General

The internal battery is used for preserving the clock and programming memory in the models 5000 and 7000. The procedure for each is given separately. There is no battery in the model 3000.

The battery is located on the CPU board. To replace the battery, you must first remove this board from the unit.

NOTE

When removing the screws, take note of their location, as it is important that they be replaced correctly.

5.2 5000 Battery Replacement

The ordering part number for the lithium battery assembly is #105003.

Necessary Tools:
- Small phillips head screwdriver
- Small soldering iron and solder
- Razor blade or X-acto knife
- Wire stripper
- Heat gun or hair dryer

Remove The CPU Board

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the database board.

2. Two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the top cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

4. The rear cover is connected to the CPU board. Slowly pull the rear cover out of the unit housing until the board is exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the mother board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws, located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

Remove The Old Battery

7. The lithium battery assembly is mounted near the D-connector. (Refer to Figure 6.) Note the polarity of the two wires from the battery to the CPU board. Using the razor blade or X-acto knife, cut along the shrink tubing on the battery lead. Unsolder these two wires from the terminals on the CPU board.

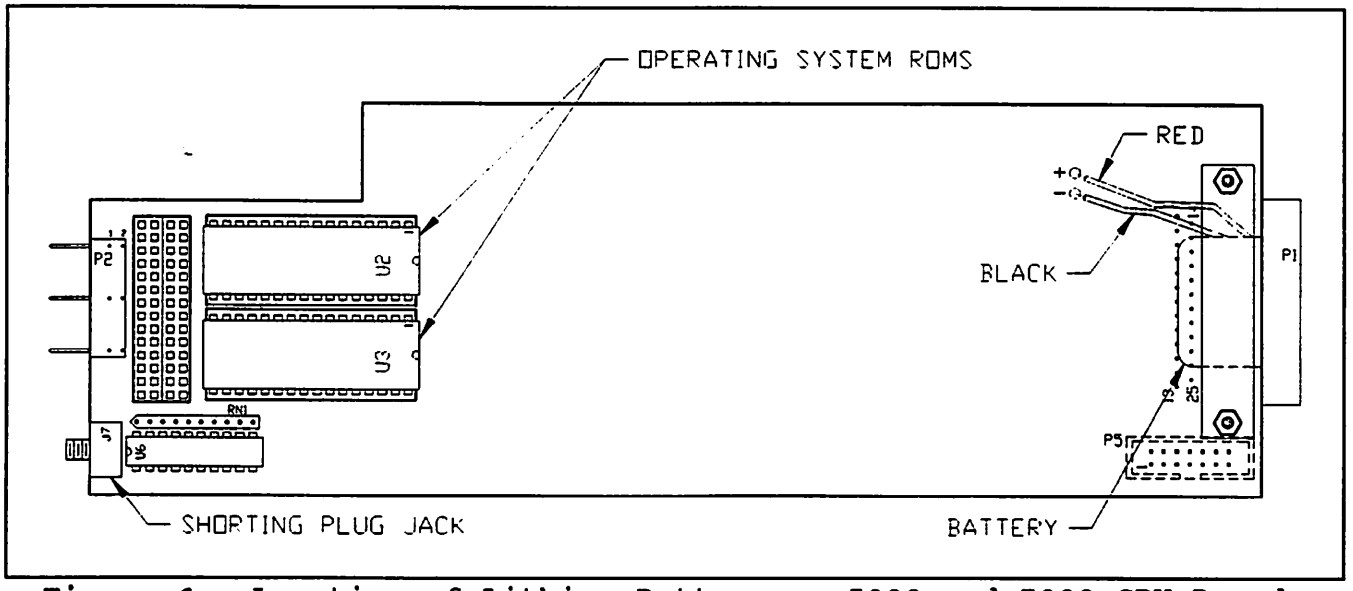

Figure 6. Location of Lithium Battery on 5000 and 7000 CPU Board.

8. Two 1/2 inch screws connect the battery assembly to the CPU board, holding the battery in place. Remove these screws from the solder side of the CPU board. The battery is now loose and can be discarded.

Insert The New Battery

9. Position the new battery assembly on the CPU board and secure it in place with the two 1/2 inch screws, inserted from the solder side of the CPU board.

10. Place the shrink tubing insulation over each wire. Cut the wires to the same length as on the old battery and strip the insulation to expose 1/8 inch of wire. **DO NOT ALLOW THE LEADS TO SHORT.**

11. Solder the wires from the new battery to the terminals on the CPU board. Be sure to use the same polarity as the previous battery. (Refer to Figure 6.)

12. Reposition the shrink tubing to cover any bare or exposed wire. Using the heat gun on an appropriate setting, apply heat to the shrink tubing so that it shrinks to insulate the wire.

Reassemble The Argus

13. Connect the rear cover to the CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

14. Insert the CPU board into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the CPU board into the slot formed by the top and bottom covers until about one inch of the board is exposed.

NOTE

You may encounter some resistance when the board gets to the deflection yoke. Just keep pushing gently but firmly until the board moves.

    b) Insert the ribbon cable into the connector on the solder side of the board. Hold the ribbon cable against the solder side of the CPU board and push the board all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

15. Secure the rear cover in place with five flat-head screws.

16. Align the connector on the database board with the pins on the CPU board. Gently push on the database board until the pins are seated as far as they will go.

17. Position the side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

18. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

CAUTION

It is important to power the unit on immediately after changing the battery. DO NOT allow the CPU board to sit without having applied power to it. The drain on the battery is much higher than normal after the battery is changed and before the disclaimer page is displayed on the unit's screen. Failure to assemble and test the unit at this point will drastically shorten battery life. After the first time the unit is powered up the battery drain will remain normal for the rest of its life.

19. At this time, set all programmable data as you would when first installing the unit. (Refer to the installation or reference manual.)

5.3 7000 Battery Replacement

The ordering part number for the lithium battery is #105003.

Necessary Tools:
- Small phillips head screwdriver
- Small soldering iron and solder
- Razor blade or X-acto knife
- Wire stripper
- Heat gun or hair dryer

Remove The CPU Board

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1 on page 6 of this manual.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

2. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the right cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

4. The rear cover is connected to the CPU and transfer boards. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the mother board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

7. The transfer board is attached to the CPU board by a connector on the end of the board nearest the front panel of the unit. Pull the transfer board from the CPU board using a gentle rocking motion.

Remove The Old Battery

8. The lithium battery assembly is mounted near the D-connector. (Refer to Figure 6 on page 21.) Note the polarity of the two wires from the battery to the CPU board. Using the razor blade or x-acto knife, cut along the shrink tubing on the battery lead. Unsolder these two wires from the terminals on the CPU board.

9. Two 1/2 inch screws attach the battery assembly to the CPU board, holding the battery in place. Remove these screws from the solder side of the CPU board. The battery is now loose and can be discarded.

Insert The New Battery

10. Position the new battery assembly on the CPU board and secure it in place with the two 1/2 inch screws, inserted from the solder side of the CPU board.

11. Place the shrink tubing insulation over each wire. Cut the wires to the same length as on the old battery and strip the insulation to expose 1/8 inch of wire. **DO NOT ALLOW THE LEADS TO SHORT.**

12. Solder the wires from the new battery to the terminals on the CPU board. Be sure to use the same polarity as the previous battery. (Refer to Figure 6 on page 21.)

13. Reposition the shrink tubing to cover any bare or exposed wire. Using the heat gun or hair dryer on its hottest setting, apply heat to the shrink tubing so that it shrinks to insulate the wire.

Reassemble The Argus

14. Position the transfer board over the CPU board and line the connector of the transfer board with the pins on the CPU board. Press firmly on the transfer board until the pins are seated as far as they will go.

15. Reconnect the rear cover to the CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

16. Insert the transfer and CPU boards into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the boards into the slots formed by the right and left covers until about one inch of the boards is exposed.

    b) Insert the ribbon cable into the connector on the solder side of the CPU board. Hold the ribbon cable against the solder side of the CPU board and push the boards all the way in.

c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the boards back out and reinsert, straightening the tangs if needed.

17. Secure the rear cover in place with five flat-head screws.

18. Gently insert the database board into the enclosure slot and apply pressure until the board engages the rear connector and the handle is flush with the bezel.

19. Tighten the two phillips-head screws to secure the database board into position.

20. Position the bottom panel in place and secure it with the ten flat-head screws (eight 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5 on page 16 of this manual. The two red screws are attached to the front panel bezel.

21. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

CAUTION

It is important to power the unit on immediately after changing the battery. DO NOT allow the CPU board to sit without having applied power to it. The drain on the battery is much higher than normal after the battery is changed and before the disclaimer page is displayed on the unit's screen. Failure to assemble and test the unit at this point will drastically shorten battery life. After the first time the unit is powered up the battery drain will remain normal for the rest of its life.

22. At this time, set all programmable data as you would when first installing the unit. (Refer to the installation or reference manual.)

Section 6
SHORTING PLUG JACK REPLACEMENT

6.1 General

The shorting plug jack is used to access setup mode in the models 5000 and 7000. This is generally done at the time of initial installation and setup or when the unit's lithium battery is changed.

Error "STATUS CODE 11" is generally caused by a problem with either the shorting plug or the shorting plug jack. If the shorting plug is in the jack when this error code appears, the failure is most likely due to the plug itself. However, if the plug is not in the jack when the error code appears, the failure is most likely due to the jack.

The shorting plug jack is located on the CPU board. To replace the jack, you must first remove this board from the unit.

NOTE

When removing the screws, take note of their location, as it is important that they be replaced correctly.

6.2 5000 Shorting Plug Jack Replacement

Soldering skills are required to perform this procedure. The ordering part number for the shorting plug jack is #315016.

Necessary Tools:
- Small phillips head screwdriver
- Small slot-head screwdriver
- Small soldering iron and solder
- Solder wick (preferred) or solder sucker

Remove The CPU Board

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the database board.

2. Two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the top cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back so as not to damage the unit.

4. The rear cover is connected to the CPU board. Slowly pull the rear cover out of the unit housing until the board is exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the mother board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws, located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

Remove The Old Jack

7. The shorting plug is mounted near the ROM chips. (Refer to Figure 7.) Heat each solder joint with the soldering iron until it melts. Remove the solder with the solder wick or solder sucker.

8. When all five holes are free of solder, gently pull the jack free of the board. The pins may have to be re-heated briefly to loosen them from any residual solder.

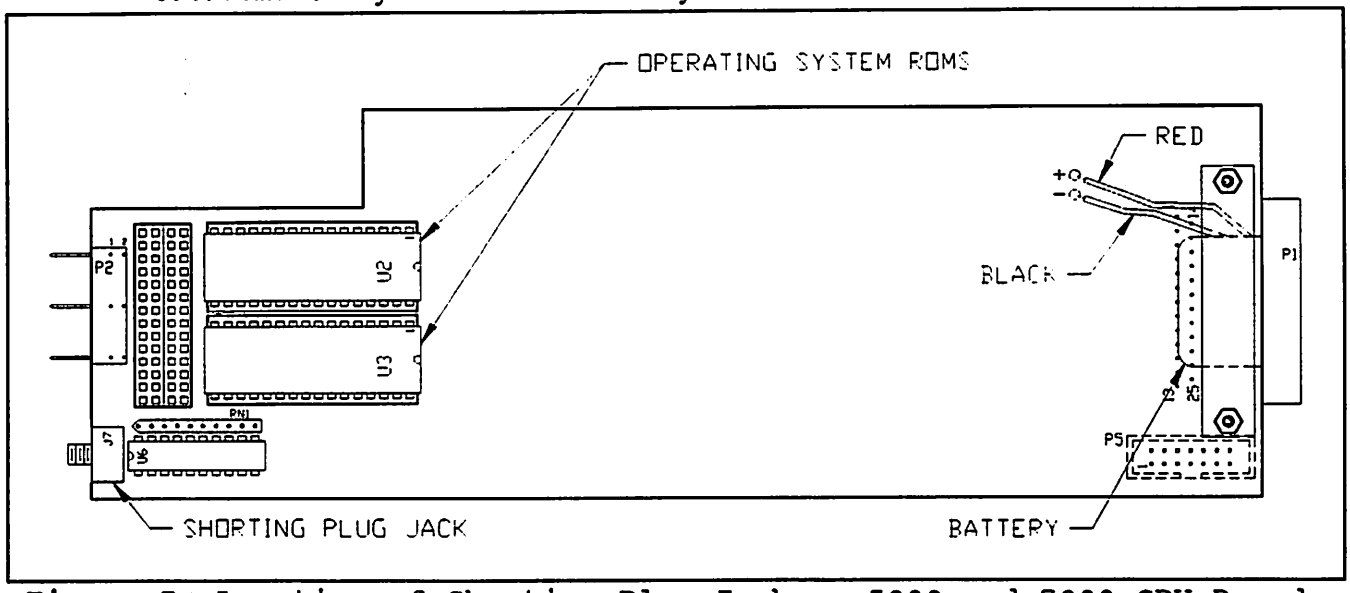

Figure 7: Location of Shorting Plug Jack on 5000 and 7000 CPU Board.

9. Remove the solder left in the five holes using the solder wick or solder sucker. Make sure that no solder is left inside the unit.

Insert The New Jack

10. Insert the pins of the replacement jack in the CPU board. Insert it in the same orientation as the jack you just removed. Solder it in place.

11. Trim the pins as close to the board as possible. Remove the flux residue with a suitable cleaner.

Reassemble The Argus

12. Connect the rear cover to the CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

13. Insert the CPU board into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the CPU board into the slot formed by the top and bottom covers until about one inch of the board is exposed.

NOTE

You may encounter some resistance when the board gets to the deflection yoke. Just keep pushing gently but firmly until the board moves.

    b) Insert the ribbon cable into the connector on the solder side of the board. Hold the ribbon cable against the solder side of the CPU board and push the board all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

14. Secure the rear cover in place with five flat-head screws.

15. Align the connector on the database board with the pins on the CPU board. Gently push on the database board until the pins are seated as far as they will go.

16. Position the side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

17. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

6.3 7000 Shorting Plug Jack Replacement

Soldering skills are required to perform this procedure. The ordering part number for the shorting plug jack is #315016.

Necessary Tools:

Small phillips head screwdriver
Small slot-head screwdriver
Small soldering iron and solder
Solder wick (preferred) or solder sucker

Remove The CPU Board

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1 on page 6 of this manual.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

2. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the right cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

4. The rear cover is connected to the CPU and transfer boards. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the mother board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

7. The transfer board is attached to the CPU board by a connector on the end of the board nearest the front panel of the unit. Pull the transfer board from the CPU board using a gentle rocking motion.

Remove The Old Jack

8. The shorting plug is mounted near the ROM chips. (Refer to Figure 7 on page 27.) Heat each solder joint with the soldering iron until it melts. Remove the solder with the solder wick or solder sucker.

9. When all five holes are free of solder, gently pull the jack free of the board. The pins may have to be re-heated briefly to loosen them from any residual solder.

10. Remove the solder left in the five holes using the solder wick or solder sucker. Make sure that no solder is left inside the unit.

Insert The New Jack

11. Insert the pins of the replacement jack in the CPU board. Insert it in the same orientation as the jack you just removed. Solder it in place.

12. Trim the pins as close to the board as possible. Remove the flux residue with a suitable cleaner.

Reassemble The Argus

13. Position the transfer board over the CPU board and line the connector of the transfer board with the pins on the CPU board. Press firmly on the transfer board until the pins are seated as far as they will go.

14. Reconnect the rear cover to the CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

15. Insert the transfer and CPU boards into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the boards into the slots formed by the right and left covers until about one inch of the boards is exposed.

    b) Insert the ribbon cable into the connector on the solder side of the CPU board. Hold the ribbon cable against the solder side of the CPU board and push the boards all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the boards back out and reinsert, straightening the tangs if needed.

16. Secure the rear cover in place with five flat-head screws.

17. Gently insert the database board into the enclosure slot and apply pressure until the board engages the rear connector and the handle is flush with the bezel.

18. Tighten the two phillips-head screws to secure the database board into position.

19. Position the bottom panel in place and secure it with the ten flat-head screws (eight 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5 on page 16 of this manual. The two red screws are attached to the front panel bezel.

20. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

Section 7
CPU BOARD REPLACEMENT

7.1 General

The procedure for replacing the CPU board on the 3000 and the 5000 are very similar. The only difference is the database board that must be removed from the 5000. Therefore these procedures are given together. The procedure for replacing the 7000's CPU board is given separately.

NOTE

When removing the screws, take note of their location, as it is important that they are replaced correctly.

In the models 5000 and 7000, the operating system ROMs are located on the CPU board. In the model 3000, the database/operating system ROMs are located on the CPU board. If the new CPU board does not contain these ROMs, you must remove the ROMs from the old CPU board and transfer them to the new CPU board. If the new CPU board DOES contain these ROMs, be sure to replace the identification plate on the unit's rear cover.

The ROMs are serialized for a specific unit. DO NOT interchange ROMs from one unit to another.

Once the CPU board is replaced, **be sure to return the old board to Eventide Avionics.**

7.2 3000 and 5000 CPU Board Replacement

The ordering part number for the 3000's CPU board is #103017. The ordering part number for the 5000's CPU board is #103001.

Necessary Tools: Small phillips head screwdriver

Remove The Old CPU Board

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the database board in the model 5000, or the CPU board in the model 3000. (If the Argus is a model 3000, skip the next step.)

2. Two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the top cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

4. The rear cover is connected to the CPU board. Slowly pull the rear cover out of the unit housing until the board is exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the power supply board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws, located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

Insert The New CPU Board

7. Remove the new CPU board from its protective packaging.

8. Check to make sure that the ROM chips are on the new CPU board. (Refer to Figure 2 on page 8 for location of ROM chips on 3000 CPU board. Refer to Figure 3 on page 11 for location of ROM chips on 5000 CPU board.)

9. If new CPU board has the required ROMs, proceed to step 10. If the ROMs are missing from the board, remove the ROMs from the old CPU and insert them in the new CPU using the procedure outlined in Sub-section 3.2 (for the 3000) and Sub-section 3.3 (for the 5000).

Reassemble the Argus

10. Connect the rear cover to the new CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

11. Insert the new CPU board into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the CPU board into the slot formed by the top and bottom covers until about one inch of the board is exposed.

NOTE

You may encounter some resistance when the board gets to the deflection yoke. Just keep pushing gently but firmly until the board moves.

    b) Insert the ribbon cable into the connector on the solder side of the board. Hold the ribbon cable against the solder side of the CPU board and push the board all the way in.

c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

12. Secure the rear cover in place with five flat-head screws.

13. If the Argus is a model 5000, align the connector on the database board with the pins on the CPU board. Gently push on the database board until the pins are seated as far as they will go. (If the Argus is a model 3000, skip this step.)

14. Position the side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

15. If a new version of ROMs were included on the new CPU board, replace the identification plate as described in Sub-section 3.5.

16. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

17. If the Argus is a model 5000, check the accuracy of its clock after it passes all of its self-tests. Reset it if necessary.

18. At this time, set any other programmable data as you would when first installing the unit. (Refer to the installation or reference manual.)

7.3 7000 CPU Board Replacement

The ordering part number for the 7000's CPU board is #103001.

Necessary Tools: Small phillips head screwdriver

Remove The Old CPU Board

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1 on page 6.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

2. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

3. The rear cover is attached to the unit housing with five flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the right cover. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

4. The rear cover is connected to the CPU and transfer boards. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

5. A ribbon cable connects the solder side of the CPU board to the power supply board. Disengage this connector and slide the CPU board completely out of the unit's housing.

6. On the rear cover there are two pan-head screws located, at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Separate the CPU board and rear cover by first removing these screws.

7. The transfer board is attached to the CPU board by a connector on the end of the board nearest the front panel of the unit. Pull the transfer board from the CPU board using a gentle rocking motion.

Insert The New CPU Board

8. Remove the replacement CPU board from its protective packaging.

9. Check to make sure that the ROM chips are on the new CPU board. (Refer to Figure 4 on page 14 for location of ROM chips on 7000 CPU board.)

10. If new CPU board has the required ROMs, proceed to step 10. If the ROMs are missing from the board, remove the ROMs from the old CPU and insert them in the new CPU using the procedure outlined in Sub-section 3.4.

Reassemble The Argus

11. Position the transfer board over the new CPU board and line the pins of the transfer board with the connector on the CPU board. Press firmly on the transfer board until the pins are seated as far as they will go.

12. Connect the rear cover to the new CPU board, securing it in place with the two pan-head screws on either end of the D-connector.

NOTE

The screws mate with locking type threads so that some turning resistance will be felt when the screws are seating.

13. Insert the transfer and CPU boards into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the boards into the slots formed by the right and left covers until about one inch of the boards is exposed.

    b) Insert the ribbon cable into the connector on the solder side of the CPU board. Hold the ribbon cable against the solder side of the CPU board and push the boards all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

14. Secure the rear cover in place with five flat-head screws.

15. Gently insert the database board into the enclosure slot and apply pressure until the board engages the rear connector and the handle is flush with the bezel.

16. Tighten the two phillips-head screws to secure the database board into position.

17. Position the bottom panel in place and secure it with the ten flat-head screws (eight 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5 on page 16. The two red screws are attached to the front panel bezel.

18. If a new version of ROMs were included on the new CPU board, replace the identification plate as described in Sub-section 3.5.

19. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

20. Check the accuracy of the unit's clock after it passes all of its self-tests. Reset it if necessary.

21. At this time, set any other programmable data as you would when first installing the unit. (Refer to the installation or reference manual.)

Section 8
DAUGHTER BOARD REPLACEMENT

8.1 General

The daughter board is a small board that is "piggy-backed" on to a larger board. This larger board is referred to as the main power supply board or as the mother board. In order to remove the daughter board from the mother board, you must completely disassemble the Argus. The instructions for replacing the daughter board in the model 3000 and 5000 are combined, since the two models are similar. The instructions for replacing the daughter board in the model 7000 are given separately.

The daughter board contains a potentiometer that controls the operating voltage of the unit. To operate correctly, this voltage should be +5 volts. Check this voltage while the unit is still partially open. (The procedures indicate the point at which voltage this should be checked.) If the voltage is not within $\pm$0.05 volts of +5 volts, adjust the voltage. Sub-section 8.4 describes how to check and adjust this voltage.

NOTE

When removing the screws, take note of their location, as it is important that they are replaced correctly.

Once the daughter board is replaced, **be sure to return the old board to Eventide Avionics.**

8.2 3000 or 5000 Daughter Board Replacement

The ordering part number for the daughter board is #103005.

The Argus 5000 has an additional board (database board) that the 3000 does not have. The instructions that follow take this into consideration.

Necessary Tools: Small phillips head screwdriver
Digital voltmeter (to check the unit's voltage)

Disassemble The Argus

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the CPU in the 3000 or the database board in the 5000. If the Argus is a model 3000, skip step 2 below.

2. In the model 5000, two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

3. Remove the left side panel in the same manner as you removed the right side panel.

4. The rear cover is attached to the unit housing with three flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the top cover at this time. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

5. The rear cover is connected to the CPU board. Slowly pull the rear cover out of the unit housing until the board is exposed approximately 1-1/2 inches.

6. A ribbon cable connects the solder side of the CPU board to the power supply board. Disengage this connector and slide the CPU board completely out of the unit's housing.

7. Remove the screws securing the bottom cover to the front bezel, and remove the bottom cover.

8. Remove the three screws that connect the top cover to the main power supply. This includes the red-marked screw and two screws in line with it.

NOTE

Be sure to note the location of the screw marked in red, as it is very important that this screw be returned to this location when reassembling the unit.

9. Remove the screws that hold the top cover to the front bezel, and remove the top cover. The power supply mother and daughter boards are now completely exposed.

CAUTION

Do not pull, pinch, nick, or otherwise damage the high voltage lead that runs from the power supply to the side of the CRT display. Damaging the wire or the insulation at either end can cause a catastrophic failure in flight.

10. Before removing the daughter board, note its location and orientation on the mother board. (Refer to Figure 8.) The daughter board is mounted to the mother board in friction type connectors. Remove the daughter board by gently pulling it straight up and off the mother board.

Replace The Daughter Board

11. Remove the new daughter board from its protective packaging.

12. Align the replacement board in the same location and orientation as the one you just removed. Carefully line up the pins on the daughter board with the connector on the mother board, and press on the daughter board until the pins are seated as far as they will go.

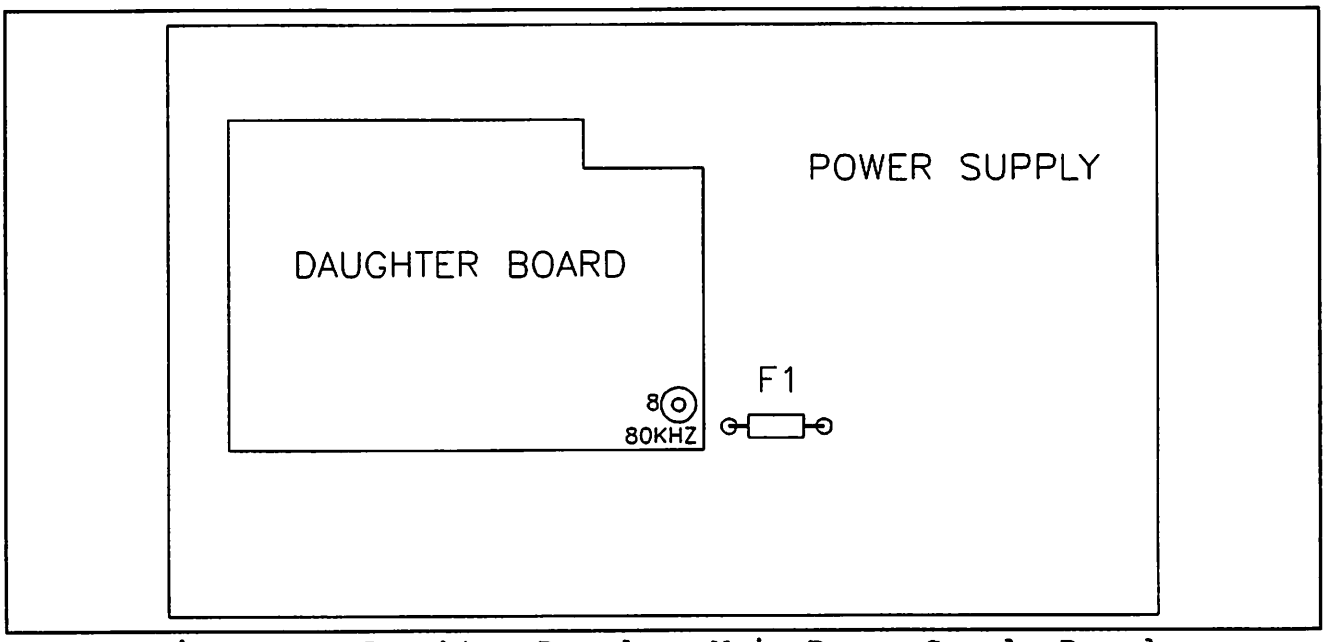

Figure 8 - Daughter Board on Main Power Supply Board.

Reassemble The Unit

13. Place the top cover in its proper position making sure the mother board fits in the groove in the top cover for this purpose. Secure the top cover to the front bezel with two flat-head screws.

14. Secure the top cover to the main power supply with three flat-head screws, one of which is the red screw.

CAUTION

Be sure to replace the red screw in its proper location (on the top cover near the rear of the unit), as illustrated in Figure 9. If you insert a longer screw at this location you will damage the Argus.

15. Position the bottom cover in place against the front bezel. Make sure that the mother board fits in the groove in the bottom cover. Make sure that the high voltage (HV) wire is routed correctly and not pinched by the yoke support. The high voltage wire must run through the slot in the yoke clamp. Secure the bottom cover to the front bezel with two flat-head screws.

16. Insert the CPU board into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the CPU board into the slot formed by the top and bottom covers until about one inch of the board is exposed.

NOTE

You may encounter some resistance when the board gets to the deflection yoke. Just keep pushing gently but firmly until the board moves.

    b) Insert the ribbon cable into the connector on the solder side of the board. Hold the ribbon cable against the solder side of the CPU board and push the board all the way in.

c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

17. DO NOT secure the rear cover in place at this time.

18. If the Argus is a model 5000, the next step is to re-install the database board. (If the Argus is a model 3000, skip this step.) Align the pins on the database board with the connectors on the CPU board. Gently push on the database board until the pins are seated as far as they will go.

19. At this point, it is recommended that you check the operating voltage on the daughter board. Follow the steps given in Sub-section 8.4 for checking and adjusting this voltage. Then continue with the final steps below.

20. Secure the rear cover in place with three flat-head screws.

21. Secure each side panel in place with 10 flat-head screws.

NOTE

Two different length screws are used on each side panel. The short screws go at the ends of the panel and the longer screws in the middle.

22. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

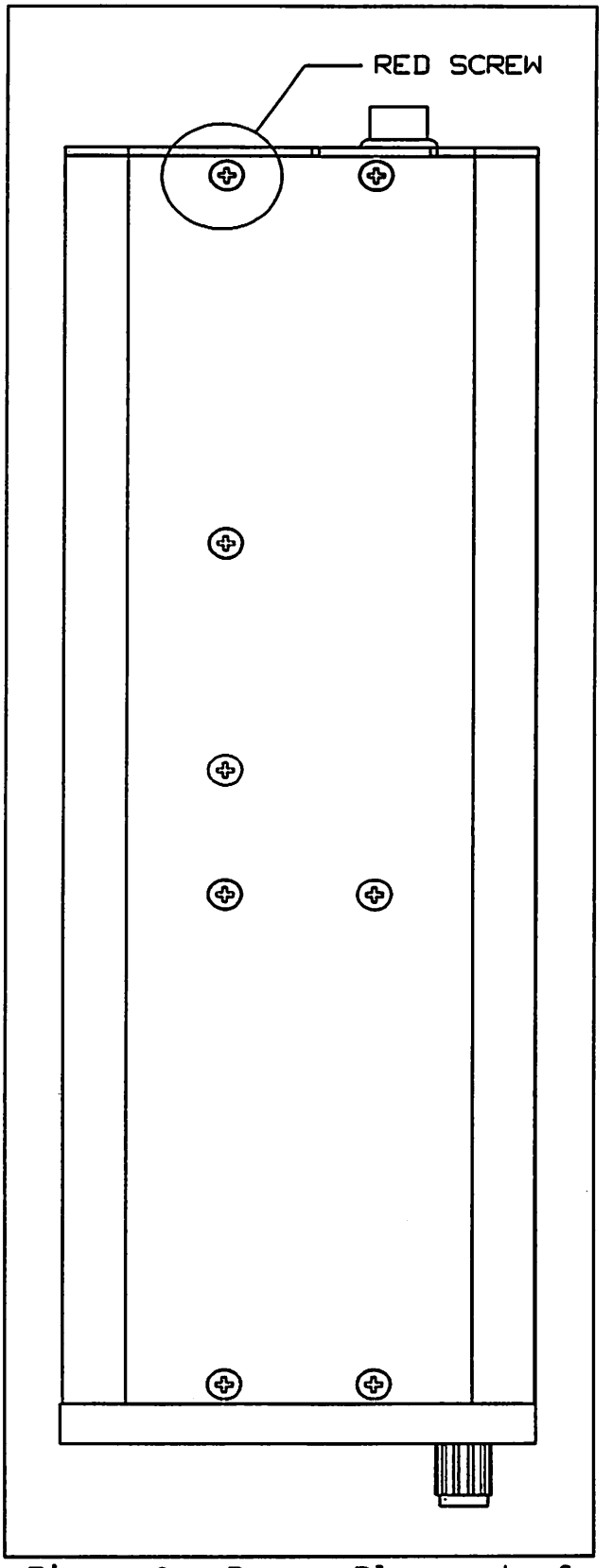

Figure 9. Proper Placement of Red-Marked Screw on Models 3000 and 5000.

8.3 Argus 7000 Daughter Board Replacement

The ordering part number for the daughter board is #103005.

Necessary Tools: Small phillips head screwdriver
Digital voltmeter (to check the unit's voltage)

Disassemble The Argus

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1 on page 6 of this manual.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

2. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

3. Remove the top panel by first removing the ten screws that secure it to the unit.

4. The rear cover is attached to the unit housing with three flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the right hand cover at this time. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

5. The rear cover is connected to the CPU and transfer boards. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

6. A ribbon cable connects the solder side of the CPU board to the power supply board. Disengage this connector and slide the CPU board completely out of the unit's housing.

7. Remove the screws securing the left cover to the front bezel, and remove the cover.

8. Remove the three screws that connect the right cover to the main power supply. This includes the red-marked screw and two screws in line with it.

NOTE

Be sure to note the location of the screw marked in red, as it is very important that this screw be returned to this location when reassembling the unit.

9. Remove the screws that hold the right cover to the front bezel, and remove the right hand cover. The power supply mother and daughter boards are now completely exposed.

CAUTION

Do not pull, pinch, nick, or otherwise damage the high voltage lead that runs from the power supply to the side of the CRT display. Damaging the wire or the insulation at either end can cause a catastrophic failure in flight.

10. Before removing the daughter board, note its location and orientation on the mother board. (Refer to Figure 8 on page 38.) The daughter board is mounted to the mother board in friction type connectors. Remove the daughter board by gently pulling it straight up and off the mother board.

Replace The Daughter Board

11. Remove the new daughter board from its protective packaging.

12. Align the replacement board in the same location and orientation as the one you just removed. Carefully line up the pins on the daughter board with the connector on the mother board, and press on the daughter board until the pins are seated as far as they will go.

Reassemble The Unit

13. Place the right cover in its proper position making sure the mother board fits in the groove in the right cover for this purpose. Secure the right cover to the front bezel with two flat-head screws.

14. Secure the right cover to the main power supply with three flat-head screws, one of which is the red screw.

CAUTION

Be sure to replace the red screw in its proper location (on the right cover near the rear of the unit), as illustrated in Figure 5 on page 16. If you insert a longer screw at this location you will damage the Argus.

15. Position the left cover in place against the front bezel. Make sure that the mother board fits in the groove in the cover. Make sure that the high voltage (HV) wire is routed correctly and not pinched by the yoke support. The high voltage wire must run through the slot in the yoke clamp. Secure the left hand cover to the front bezel with two flat-head screws.

16. Insert the transfer and CPU boards into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the boards into the slots formed by the right and left covers until about one inch of the boards is exposed.

    b) Insert the ribbon cable into the connector on the solder side of the CPU board. Hold the ribbon cable against the solder side of the CPU board and push the boards all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

17. DO NOT secure the rear cover in place at this time.

18. Gently insert the database board into the enclosure slot and apply pressure until the board engages the rear connector and the handle is flush with the bezel. The CPU board must be held in place or the database board will push it out the back of the unit. Make sure the database connector is fully seated.

19. Tighten the two phillips-head screws to secure the database board into position.

20. Position the bottom panel in place and secure it with the eight flat-head screws (six 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5 on page 16. The two red screws are attached to the front panel bezel. (The rear cover screws are not replaced at this stage.)

21. At this point, it is recommended that you check the operating voltage on the daughter board. Follow the steps given in Sub-section 8.4 for checking and adjusting this voltage. Then continue with the final steps below.

22. Secure the rear cover in place with five flat-head screws.

23. Secure the top panel in place with 10 flat-head screws each.

24. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

8.4 Check The Operating Voltage

All boards must be in place to check the voltage. The rear cover of the Argus must be removed to expose the potentiometer on the daughter board.

To operate correctly, the Argus should be operating at +5 volts ($\pm$0.05 volts). This voltage may need to be adjusted after the daughter board is replaced. All boards must be installed in the unit, and the unit must be powered on before its voltage can be tested.

WARNING

The high voltage wire carries 8000 volts! Do not apply power to the unit while the high voltage wire is exposed. If there is high voltage leakage in the unit and you accidently touch the high voltage wire, serious injury could result.

Necessary Tools:
Small phillips head screwdriver
Digital voltmeter (to check the unit's voltage)
Very thin flat head screwdriver

NOTE

This procedure should be entered into from one of the two proceeding procedures (replacing the daughter board). At the point in each procedure that sends you here, the unit is partially assembled. The top (model 7000) or side (models 3000 and 5000) panels have not yet been replaced. Also the rear cover is secured with only two screws to the CPU board.

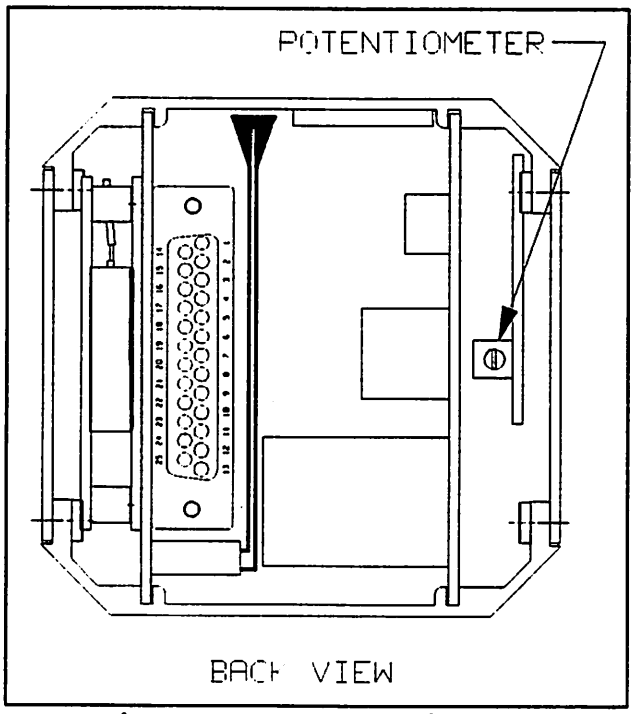

Figure 10. Location of Potentiometer on 3000 & 5000.

Remove The Rear Cover

1. On the rear cover there are two pan-head screws, located at either end of the 25 pin D-connector, which secure the rear cover to the CPU board. Remove these two screws and remove the rear cover. The potentiometer on the daughter board is now exposed. (Refer to Figures 10 and 11.)

Check/Adjust The Voltage

2. Connect the Argus to a 11-30 volt power source.

3. Use a multi meter to measure the voltage between pins 5 (GND) and 6 (+5 FB) on the daughter board.

4. If voltage is within $\pm$0.05 of +5 volts, go to step 6.

5. Using a very thin flat head screwdriver, adjust the potentiometer in either direction until it is within $\pm$0.05 of +5 volts.

NOTE

The potentiometer is VERY sensitive. Adjust it in small increments.

Reconnect Rear Cover

6. Turn off the Argus and disconnect the power to the unit.

7. Place the rear cover on the unit. Connect the two pan-head screws on either side of the 25-pin D connector.

8. Return to the point at which you left the previous procedure to complete assembly of the unit.

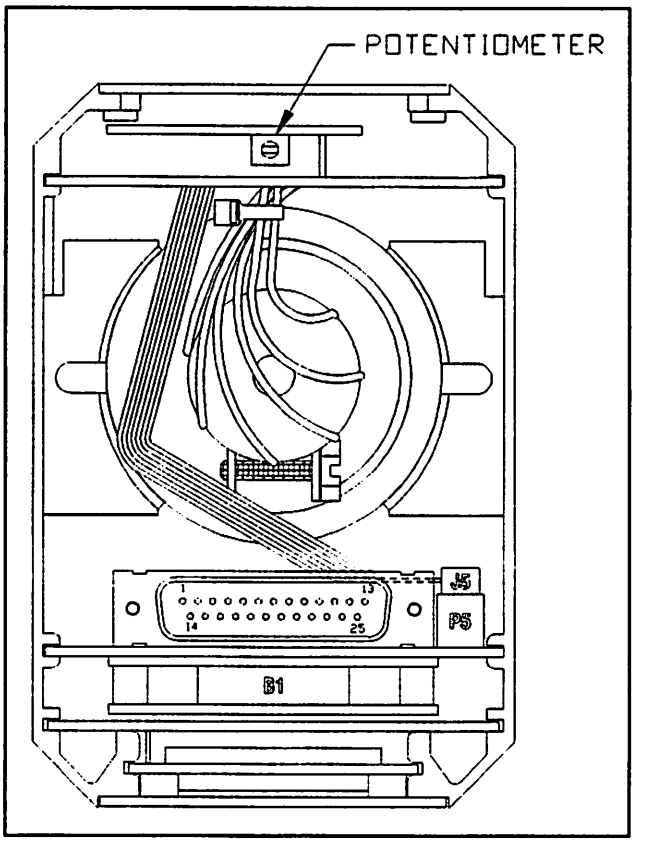

Figure 11. Location of Potentiometer on 7000.

Section 9
FUSE REPLACEMENT

9.1 General

The mother board contains a three amp pico fuse (series 255). This fuse can "blow" (open circuit) because of an electronic problem or because of a transient on the power supply bus to the unit. If the failure is due to an electronic problem, the unit needs to be returned to Eventide for repair. If the fuse failed because of a transient condition, simply replace the fuse following the procedure outlined below.

NOTE

If the wrong screw was replaced in the location where the red-marked screw belongs, then it is probable that the Bergquist pad was punctured. This would short the shielding in the power supply, and cause the fuse to blow. If this is the case, the unit must be returned to Eventide for repair.

You can test the fuse for continuity using a multi-meter to determine if it needs to be replaced.

The mother board has been coated by a moisture resistant substance, called conformal coating. This coating must be scraped away in the area of the fuse in order to remove the old fuse. Use caution when removing this coating so as not to damage any traces or pads on the board, or any adjacent components.

The instructions for replacing the fuse in the 3000 and 5000 are given together. The instructions for replacing the fuse in the 7000 are given separately.

NOTE

When removing the screws, take note of their location, as it is important that they are replaced correctly.

9.2 3000 and 5000 Fuse Replacement

The ordering part number for the 3-amp pico fuse is #316019.

Soldering skills are required to perform this procedure.

The Argus 5000 has an additional board (database board) that the 3000 does not have. The instructions that follow take this into consideration.

Necessary Tools:

Small phillips head screwdriver
Small slot-head screwdriver
Toluene
Solder wick (preferred) or solder sucker
Soldering iron and solder
Small needle-nose pliers
Ohmmeter or battery powered test light (optional)

Expose The Fuse

1. Remove the screws from the left side panel (panel furthest from the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the power supply mother and daughter boards.

2. The daughter board has a pin connector labeled with the number "8." The label "80 khz" is also near this connector. The fuse on the mother board is situated diagonally below this pin. (Refer to Figure 12.)

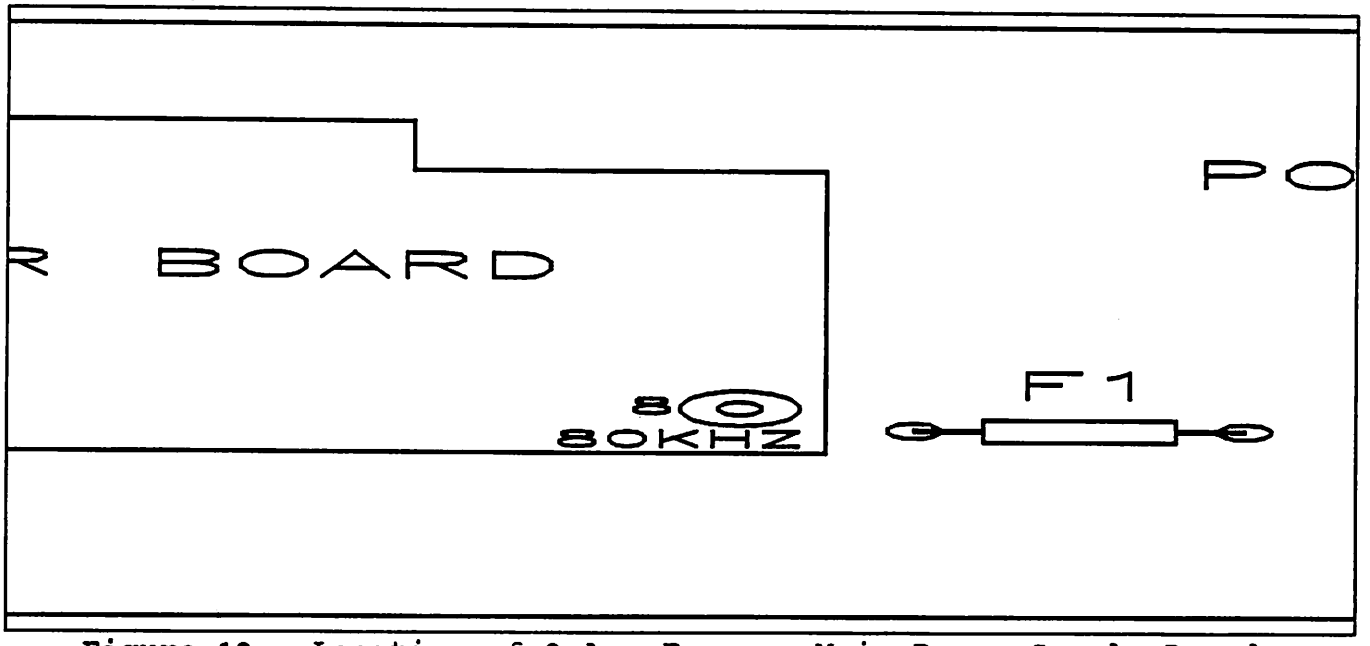

Figure 12 - Location of 3-Amp Fuse on Main Power Supply Board.

3. Gently pull up on the corner of the daughter board near the pin marked "8." This will allow easier access to the fuse.

Test The Fuse

4. You may wish to test the fuse before replacing it. If a battery powered test light is connected across the fuse and it lights, the fuse is good. Likewise, if an ohmmeter connected across the fuse reads less than 0.2 ohm, the fuse is good and should not be replaced.

Remove The Old Fuse

5. To remove the old fuse, you first have to remove the conformal coating around it. If you have toluene, apply a small amount to the area immediately around the points where the fuse is soldered to the board. This will soften the conformal coating and make it easier to scrape away.

6. Using the end of a small slot-head screwdriver, gently scrape away the conformal coating from the soldered ends of the fuse. Use just enough pressure to remove the coating.

CAUTION

Be careful not to damage any of the traces or pads on the board.

7. Using the small needle nose pliers, grasp the lead at one end of the fuse. Heat the solder joint with the soldering iron until it melts and the lead can be gently pulled free of the board. Heat the other solder joint until it melts and gently pull the fuse free of the board.

8. Remove the solder left in the two holes using a solder wick. If a solder wick is not available, a solder sucker can be used. Make sure that no solder fragments are left inside the unit.

Insert The New Fuse

9. Take the replacement fuse and trim the leads to the same length as the old fuse. Then take the needle nose pliers and bend the leads down so that they can enter the holes in the power supply board.

10. Insert the new fuse (orientation does not matter) into the opening and solder it in place.

11. Gently push the daughter board down into the power supply board as far as it will go.

12. Position the left side panel and secure it in place with 10 flat-head screws.

NOTE

Two different length screws are used on the side panel. The short screws go at the ends of the panel and the longer screws in the middle.

13. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

9.3 7000 Fuse Replacement

The ordering part number for the 3-amp pico fuse is #316019.

Soldering skills are required to perform this procedure.

Necessary Tools:

Small phillips head screwdriver
Small slot-head screwdriver
Toluene
Solder wick (preferred) or solder sucker
Soldering iron and solder
Small needle-nose pliers
Ohmmeter or battery powered test light (optional)

Expose The Fuse

1. Remove the 10 screws that hold the top panel in place. Remove the top panel to expose the power supply mother and daughter boards.

2. The daughter board has a pin connector labeled with the number "8." The label "80 khz" is also near this connector. The fuse on the mother board is situated diagonally below this pin. (Refer to Figure 12 on page 46.)

3. Gently pull up on the corner of the daughter board near the pin marked "8." This will allow easier access to the fuse.

Test The Fuse

4. You may wish to test the fuse before replacing it. If a battery powered test light is connected across the fuse and it lights, the fuse is good. Likewise, if an ohmmeter connected across the fuse reads less than 0.2 ohm, the fuse is good and should not be replaced.

Remove The Old Fuse

5. To remove the old fuse, you first have to remove the conformal coating around it. If you have toluene, apply a small amount to the area immediately around the points where the fuse is soldered to the board. This will soften the conformal and make it easier to scrape away.

6. Using the end of a small slot-head screwdriver, gently scrape away the conformal coating from the soldered ends of the fuse. Use just enough pressure to remove the coating.

CAUTION

Be careful not to damage any of the traces or pads on the board.

7. Using the small needle nose pliers, grasp the lead at one end of the fuse. Heat the solder joint with the soldering iron until it melts and the lead can be gently pulled free of the board. Heat the other solder joint until it melts and gently pull the fuse free of the board.

8. Remove the solder left in the two holes using a solder wick. If a solder wick is not available, a solder sucker can be used. Make sure that no solder fragments are left inside the unit.

Insert The New Fuse

9. Take the replacement fuse and trim the leads to the same length as the old fuse. Then take the needle nose pliers and bend the leads down so that they can enter the holes in the power supply board.

10. Insert the new fuse (orientation does not matter) into the opening and solder it in place.

11. Gently push the daughter board down into the power supply board as far as it will go.

12. Position the top panel and secure it in place with 10 flat-head screws.

13. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

Section 10
ON/OFF SWITCH REPLACEMENT

10.1 General

The ON/OFF switch is most often damaged as a result of being used as a "handle" or "grip" for removing the unit out of the aircraft. The proper way to remove the Argus from the aircraft is as follows:

1. Loosen the two top-most phillips head screws approximately 3 full turns counter clockwise.

2. Apply pressure to these two screws to release the clamp fixture.

3. Insert a removal tool or a dull-edged flat-blade screwdriver into both slots in the sides of the bezel, and apply light pulling pressure to remove the Argus from its tray.

In order to replace the ON/OFF switch, you must completely disassemble the Argus. The instructions for replacing this switch in the model 3000 and 5000 are combined, since the two models are so similar. The instructions for replacing this switch in the model 7000 are given separately.

NOTE

When removing the screws, take note of their location, as it is important that they are replaced correctly.

10.2 3000 and 5000 ON/OFF Switch Replacement

The ordering part number for the ON/OFF switch assembly is #300167. Be sure to specify Argus model.

Necessary Tools:
Small phillips head screwdriver
Allen key (0.050")
Small open end wrench (5/16")

Disassemble The Argus

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the CPU in the 3000 or the database board in the 5000. If the Argus is a model 3000, skip step 2 below.

2. In the model 5000, two pairs of small pins and two 28 pin connectors on the component side of the database board connect it to the underlying CPU board. The connectors are located near the front panel bezel. Gently pull on the database board, lifting it up from the back of the unit and wiggling it gently to disengage it from the connector on the CPU board. Remove the database board from the unit's housing.

3. Remove the left side panel in the same manner as you removed the right side panel.

4. The rear cover is attached to the unit housing with three flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the top cover at this time. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

5. The rear cover is connected to the CPU board. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

6. A ribbon cable connects the solder side of the CPU board to the mother board. Disengage this connector and slide the CPU board completely out of the unit's housing.

7. Remove the screws securing the bottom cover to the front bezel, and remove the bottom cover.

8. At this point the ON/OFF switch can be seen. (Refer to Figure 13.) Note its orientation in relation to the top cover and the mother board. Disconnect the ON/OFF switch assembly from the mother board by pulling up on the connector.

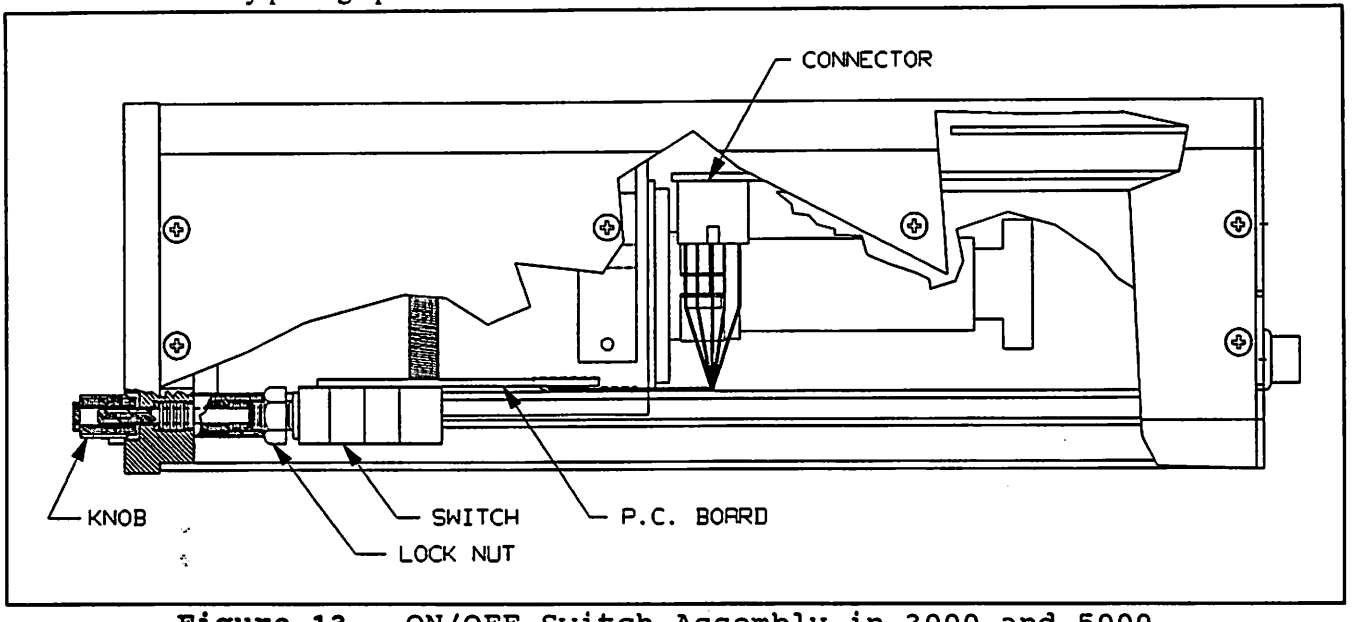

Figure 13. ON/OFF Switch Assembly in 3000 and 5000.

9. Use the 0.050" allen key to loosen the set screw on the front panel ON/OFF knob. Remove the knob from the switch assembly.

Remove The Top Cover

10. Remove the three screws that connect the top cover to the main power supply. This includes the red-marked screw and two screws in line with it.

NOTE

Be sure to note the location of the screw marked in red, as it is very important that this screw be returned to this location when reassembling the unit.

11. Remove the screws that hold the top cover to the front bezel, and remove the top cover.

CAUTION

Do not pull, pinch, nick, or otherwise damage the high voltage lead that runs from the power supply to the side of the CRT display. Damaging the wire or the insulation at either end can cause a catastrophic failure in flight.

Remove The Old ON/OFF Switch

12. Use the 5/16" open end wrench to loosen the lock-nut on the shaft of the ON/OFF switch.

13. Unscrew the ON/OFF switch assembly by turning the whole assembly counter clockwise. Remove the assembly from the unit.

Insert The New ON/OFF Switch

14. Screw the new switch assembly into place. Once it is oriented correctly (as noted previously) tighten the lock-nut using the open end wrench.

15. Push the connector into place on the mother board.

16. Install the front panel ON/OFF knob by first positioning it and then tightening the set screw with the allen key. The ON/OFF knob also controls the brightness of the unit's screen. Orient the white dot on the knob so that it is at 7 o'clock when the screen is dim, and at 5 o'clock when the screen is at its maximum brightness.

Reassemble The Unit

17. Place the top cover in its proper position making sure the mother board fits in the groove in the top cover for this purpose. Secure the top cover to the front bezel with two flat-head screws.

18. Secure the top cover to the main power supply with three flat-head screws, one of which is the red screw.

CAUTION

Be sure to replace the red screw in its proper location (on the top cover near the rear of the unit), as illustrated in Figure 9 on page 39. If you insert a longer screw at this location you will damage the Argus.

19. Position the bottom cover in place against the front bezel. Make sure that the mother board fits in the groove in the bottom cover. Make sure that the high voltage (HV) wire is routed correctly and not pinched by the yoke support. The high voltage wire must run through the slot in the yoke clamp. Secure the bottom cover to the front bezel with two flat-head screws.

20. Insert the CPU board into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the CPU board into the slot formed by the top and bottom covers until about one inch of the board is exposed.

NOTE

You may encounter some resistance when the board gets to the deflection yoke. Just keep pushing gently but firmly until the board moves.

    b) Insert the ribbon cable into the connector on the solder side of the board. Hold the ribbon cable against the solder side of the CPU board and push the board all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

21. Secure the rear cover in place with three flat-head screws.

22. If the Argus is a model 5000, the next step is to re-install the database board. (If the Argus is a model 3000, skip this step.) Align the pins on the database board with the connectors on the CPU board. Gently push on the database board until the pins are seated as far as they will go.

23. Secure each side panel in place with 10 flat-head screws.

NOTE

Two different length screws are used on each side panel. The short screws go at the ends of the panel and the longer screws in the middle.

24. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

10.3 7000 ON/OFF Switch Replacement

The ordering part number for the ON/OFF switch assembly is #300167.

Necessary Tools:
Small phillips head screwdriver
Allen key (0.050")
Small open end wrench (5/16")

Disassemble The Argus

1. Loosen the two phillips head screws on both sides of the database handle on the front panel of the 7000. (Refer to Figure 1 on page 6 of this manual.) Gently pull on the handle to slide the database board out of the front of the unit.

   If difficulty is encountered in removing the database, grasp the handle firmly and wiggle it from side to side while pulling.

CAUTION

DO NOT use a screwdriver or other device to remove the database board. Using any tool to pry out the board will damage the bezel and database board.

2. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

3. Remove the top panel by first removing the ten screws that secure it to the unit.

4. The rear cover is attached to the unit housing with three flat-head screws. Remove these screws.

CAUTION

Do not remove the red-marked screw on the right hand cover at this time. This screw does not secure the rear cover. This screw is not as long as the others because there is not as much clearance at this location. If you remove this screw, be sure to put the correct screw back in this location so as not to damage the unit.

5. The rear cover is connected to the CPU and transfer boards. Slowly pull the rear cover out of the unit housing until the boards are exposed approximately 1-1/2 inches.

6. A ribbon cable connects the solder side of the CPU board to the mother board. Disengage this connector and slide the CPU board completely out of the unit's housing.

7. Remove the screws securing the left cover to the front bezel, and remove the cover.

8. At this point the ON/OFF switch can be seen. (Refer to Figure 14.) Note its orientation in relation to the right cover and the mother board. Disconnect the ON/OFF switch assembly from the mother board by pulling up on the connector.

9. Use the 0.050" allen key to loosen the set screw on the front panel ON/OFF knob. Remove the knob from the switch assembly.

Remove The Right Cover

10. Remove the three screws that connect the right cover to the main power supply. This includes the red-marked screw and two screws in line with it.

NOTE

Be sure to note the location of the screw marked in red, as it is very important that this screw be returned to this location when reassembling the unit.

11. Remove the screws that hold the right cover to the front bezel, and remove the cover.

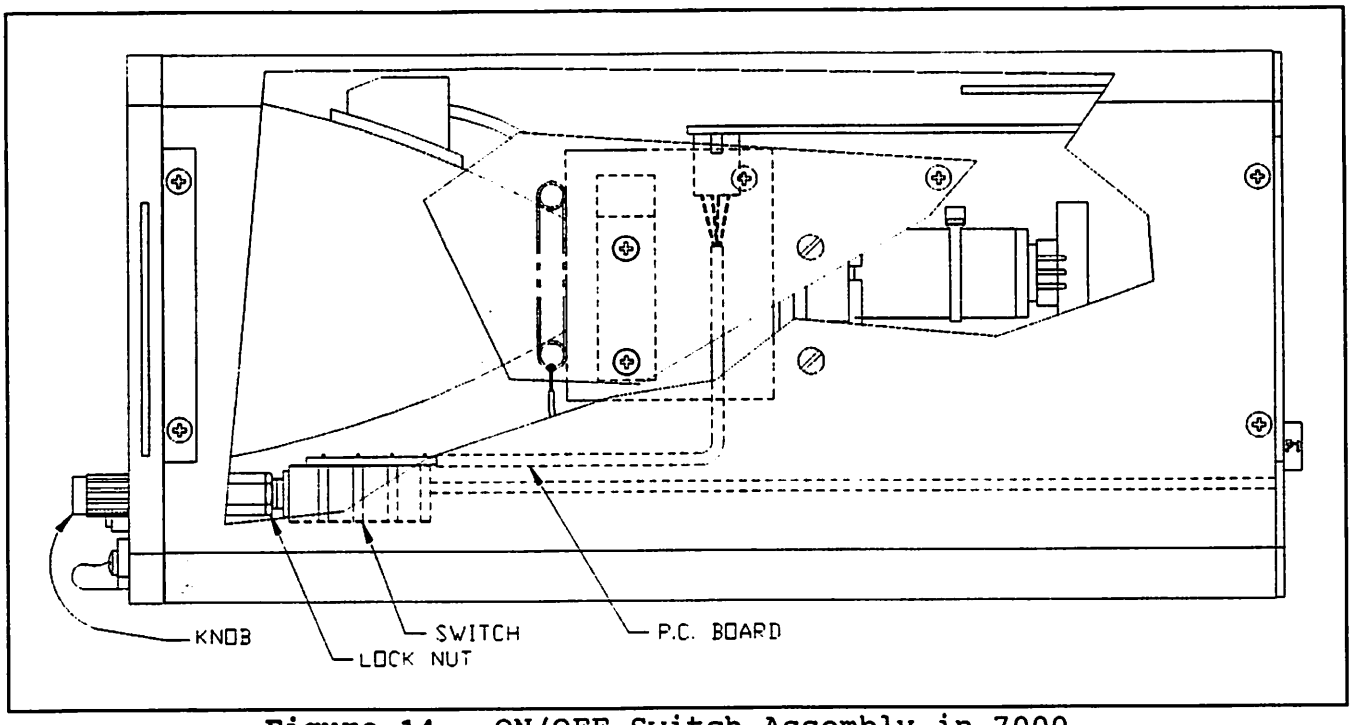

Figure 14. ON/OFF Switch Assembly in 7000.

CAUTION

Do not pull, pinch, nick, or otherwise damage the high voltage lead that runs from the power supply to the side of the CRT display. Damaging the wire or the insulation at either end can cause a catastrophic failure in flight.

Remove The Old ON/OFF Switch

12. Use the 5/16" open end wrench to loosen the lock-nut on the shaft of the ON/OFF switch.

13. Unscrew the ON/OFF switch assembly by turning the whole assembly counter clockwise. Remove the assembly from the unit.

Insert The New ON/OFF Switch

14. Screw the new switch assembly into place. Once it is oriented correctly (as noted previously) tighten the lock-nut using the open end wrench.

15. Push the connector into place on the mother board.

16. Install the front panel ON/OFF knob by first positioning it and then tightening the set screw with the allen key. The ON/OFF knob also controls the brightness of the unit's screen. Orient the white dot on the knob so that it is at 7 o'clock when the screen is dim, and at 5 o'clock when the screen is at its maximum brightness.

Reassemble The Unit

17. Place the right cover in its proper position making sure the mother board fits in the groove in the right cover for this purpose. Secure the right cover to the front bezel with two flat-head screws.

18. Secure the right cover to the main power supply with three flat-head screws, one of which is the red screw.

CAUTION

Be sure to replace the red screw in its proper location (on the right cover near the rear of the unit), as illustrated in Figure 5 on page 16 of this manual. If you insert a longer screw at this location you will damage the Argus.

19. Position the left cover in place against the front bezel. Make sure that the mother board fits in the groove in the cover. Make sure that the high voltage (HV) wire is routed correctly and not pinched by the yoke support. The high voltage wire must run through the slot in the yoke clamp. Secure the left cover to the front bezel with two flat-head screws.

20. Insert the transfer and CPU boards into the unit housing as follows:

    a) Hold the ribbon cable out of the way and insert the boards into the slots formed by the right and left covers until about one inch of the boards is exposed.

    b) Insert the ribbon cable into the connector on the solder side of the CPU board. Hold the ribbon cable against the solder side of the CPU board and push the boards all the way in.

    c) Verify that the tangs on the front edge of the CPU board have engaged in the switch socket on the front panel bezel. If not, slide the board back out and reinsert, straightening the tangs if needed.

21. Secure the rear cover in place with three flat-head screws.

22. Gently insert the database board into the enclosure slot and apply pressure until the board engages the rear connector and the handle is flush with the bezel.

23. Tighten the two phillips-head screws to secure the database board into position.

24. Position the bottom panel in place and secure it with the ten flat-head screws (eight 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5 on page 16 of this manual. The two red screws are attached to the front panel bezel.

25. Secure the top panel in place with 10 flat-head screws.

26. Apply power to the unit and verify that the unit passes all of its self tests. If an error results during the self-tests, or if the unit fails to power on, refer to Section 4 of this manual.

Section 11
KEY CAP REPLACEMENT

11.1 General

The keys on the Argus front panel get plenty of use. Over time, the key caps may become worn. If the unit is dropped or struck, the key caps may crack. Refer to Table 1 for replacement key cap part numbers. We recommend replacing all four caps to assure uniform appearance.

11.2 Key Cap Replacement

The key caps are replaced in a simple two step procedure. Before you begin, take note of the location of the different keys. Replace one key cap at a time to avoid putting them in the wrong location.

1. Grasp the cap to be removed firmly on two sides and pull. Do not apply too much pressure or you may break the cap. The cap will "pop" out, leaving a white plastic fitting in the socket. If you experience difficulty in removing the cap, insert a knife blade along the side of the cap to pry it out of its socket.

2. Position the replacement cap in place over the white plastic fitting. Make sure that the printing is oriented the proper direction and press until the cap "pops" into place.

Section 12
DISPLAY ADJUSTMENTS

12.1 General

The screen display settings are adjusted at the factory before the unit is shipped. Generally, these settings do not need to be changed.

A small amount of left to right centering can be accomplished by selecting the correct option in one of the setup menus. This should be sufficient to correct for most parallax problems when mounting the unit off-center in the instrument panel.

The process of adjusting these settings is the same in all three units. Brightness, linearity, focus, and horizontal size are all adjusted from the main power supply board. Only one panel needs to be removed from the unit to expose this board for the necessary adjustments. Centering of the image is controlled by swash plates on the unit's yoke.

No replacement parts are needed to adjust the display settings.

12.2 Adjusting Swash Plates (Centering Image)

The swash plates are reached by removing a considerable amount of the unit's housing.

NOTE

If the image on the screen doesn't appear to be centered properly, check the operating voltage. (Refer to Sub-section 8.4.) If the voltage is not set to 5 Volts (±0.05 Volts), the image will not be properly centered. Adjust the voltage using the potentiometer as described in Sub-section 8.4.

12.2.1 Adjusting the Swash Plates in 3000 and 5000

Although these adjustments are made with the unit powered on, disconnect power to the unit before disassembling or reassembling it.

Necessary Tools: Small phillips head screwdriver
Glyptol or clear nail polish

Disassemble The Unit

1. Remove the screws from the right side panel (panel nearest the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the CPU in the 3000 or the database board in the 5000.

2. Remove the left side panel in the same manner as you removed the right side panel.

3. Remove the screws securing the bottom cover to the front bezel and rear cover, and remove the bottom cover.

4. At this point the swash plates can be seen on the back end of the yoke. (Refer to Figure 15.)

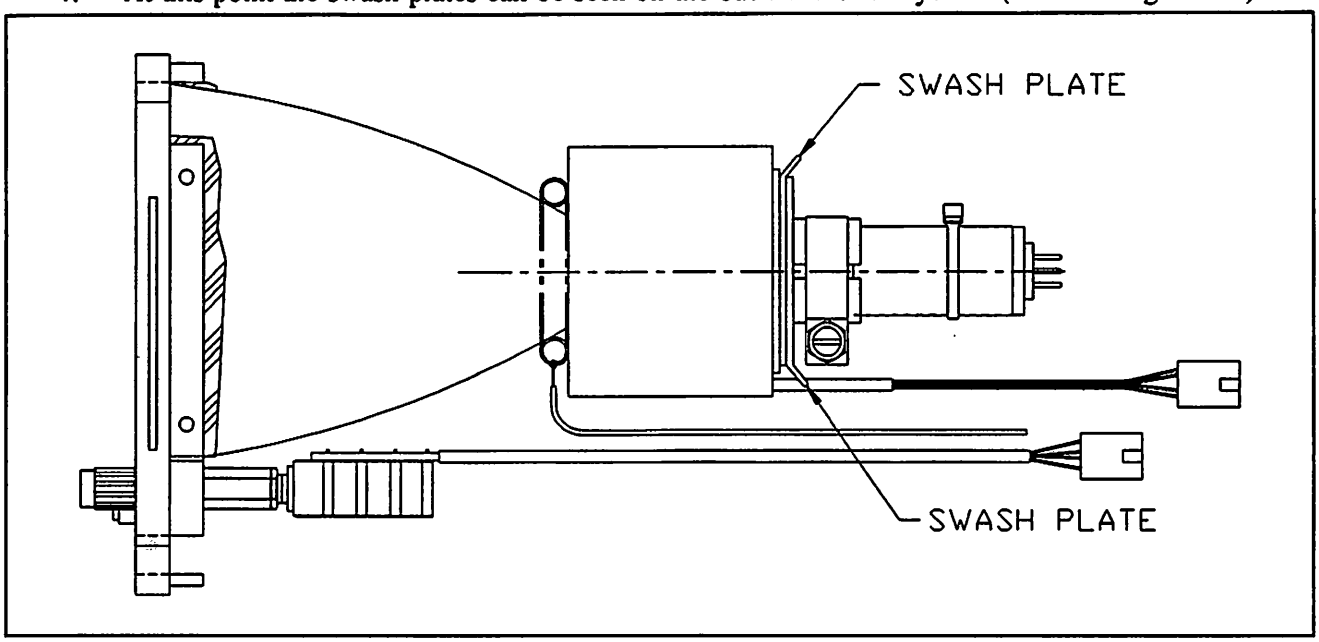

Figure 15. Location of Swash Plates on Yoke.

Adjust The Swash Plates

5. Connect the Argus to a 11-30 volt power source and power the unit on.

WARNING

The high voltage wire carries 8000 volts! This voltage can cause a lethal shock.

CAUTION

Do not pull, pinch, nick, or otherwise damage the high voltage lead that runs from the power supply to the side of the CRT display. Damaging the wire or the insulation at either end can cause a catastrophic failure in flight.

6. Adjust the swash plates by rotating them around the yoke until the image is centered on the screen. It may be necessary to rotate them together or in opposite directions. It may take some force at first to break them free from the glyptol applied at the factory.

7. Use the glyptol or nail polish to secure the swash plates in place. Wait for this to dry before reassembling the unit.

8. Turn off the unit and disconnect the power source.

Reassemble The Argus

9. Position the bottom cover in place against the front bezel. Make sure that the mother board and CPU board fit in the grooves in the bottom cover. Make sure that the high voltage (HV) wire is routed correctly and not pinched by the yoke support. The high voltage wire must run through the slot in the yoke clamp. Secure the bottom cover to the front bezel and rear cover with four flat-head screws.

10. Secure each side panel in place with 10 flat-head screws. The left side cover has a small rubber bumper on the inside which is positioned over the daughter board.

NOTE

Two different length screws are used on each side panel. The short screws go at the ends of the panel and the longer screws in the middle.

12.2.2 Adjusting the Swash Plates in 7000

Although these adjustments are made with the unit powered on, disconnect power to the unit before disassembling or reassembling it.

Necessary Tools: Small phillips head screwdriver
Glyptol or clear nail polish

Disassemble The Argus

1. The bottom panel is held in place with 10 screws: eight 3/16 inch screws and two 1/8 inch screws. The 1/8 inch screws are marked in red. Note their location, then remove all ten screws to remove the bottom panel.

2. Remove the top panel by first removing the ten screws that secure it to the unit.

3. Remove the screws securing the left cover to the front bezel and rear cover, and remove the left cover. This is the side nearest to the shorting plug jack.

4. At this point the swash plates can be seen on the back of the yoke. (Refer to Figure 15 on page 55.)

Adjust The Swash Plates

5. Connect the Argus to a 11-30 volt power source and power the unit on.

WARNING

The high voltage wire carries 8000 volts! This voltage can cause a lethal shock.

CAUTION

Do not pull, pinch, nick, or otherwise damage the high voltage lead that runs from the power supply to the side of the CRT display. Damaging the wire or the insulation at either end can cause a catastrophic failure in flight.

6. Adjust the swash plates by rotating them around the yoke until the image is centered on the screen. It may be necessary to rotate them together or in opposite directions. It may take some force at first to break them free from the glyptol applied at the factory.

7. Use the glyptol or nail polish to secure the swash plates in place. Wait for this to dry before reassembling the unit.

8. Turn off the unit and disconnect the power source.

Reassemble The Argus

9. Position the left cover in place against the front bezel. Make sure that the mother board, CPU board, and transfer board fit in the grooves in the cover. Make sure that the high voltage (HV) wire is routed correctly and not pinched by the yoke support. The high voltage wire must run through the slot in the yoke clamp. Secure the left cover to the front bezel and rear cover with four flat-head screws.

10. Position the bottom panel in place and secure it with the ten flat-head screws (eight 3/16 inch and two 1/8 inch). Be sure to replace the red-marked screws in the positions noted previously and depicted in Figure 5 on page 16 of this manual. The two red screws are attached to the front panel bezel.

11. Secure the top panel in place with 10 flat-head screws. The top panel has a small rubber bumper on the inside which is positioned over the daughter board.

12.3 Other Adjustments

Although these adjustments are made with the unit powered on, disconnect power to the unit before removing or replacing the panel.

Necessary Tools: Small phillips head screwdriver
Very small slot-head screwdriver

Expose The Power Supply Board

1. If your Argus is a model 3000 or 5000, remove the screws from the left side panel (panel furthest from the operating controls). Note the position of smaller screws versus larger ones. Remove this panel to expose the power supply mother and daughter boards. Refer to Figure 16 for location of adjustments.

2. If your Argus is a model 7000, remove the 10 screws that hold the top panel in place. Remove the top panel to expose the power supply mother and daughter boards. Refer to Figure 16 for location of adjustments.

3. Connect the Argus to a 11-30 volt power source and power the unit on.

Adjust Brightness

4. Locate the two adjustments labeled "BRIGHT" and "DIM" in Figure 16.

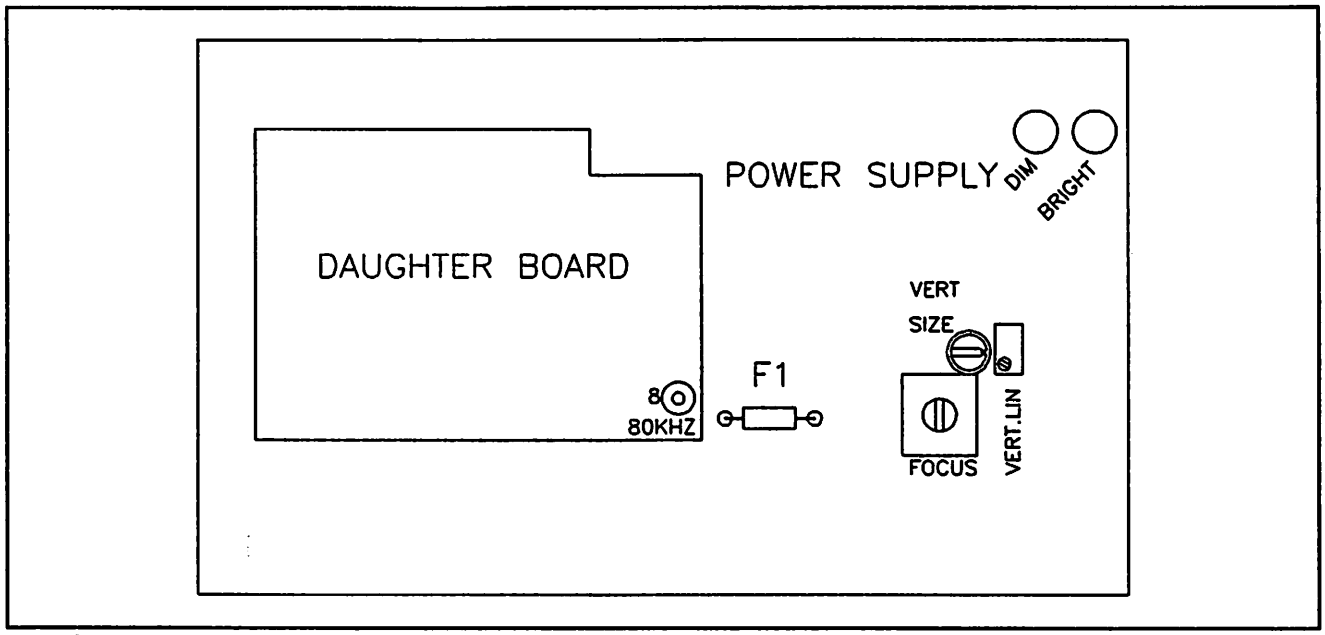

Figure 16 - Location of Display Adjustments on Main Power Supply Board.

5. Turn the ON/OFF brightness control on the front of the unit all the way counter-clockwise to the dimmest setting. Adjust the potentiometer marked "DIM" until the screen is just visible in near darkness.

6. Turn the ON/OFF brightness control all the way clockwise to the brightest setting. Adjust the potentiometer marked "BRIGHT" until the disclaimer page is readable in direct sunlight without having the image "bloom" or expand.

Adjust Linearity

7. Locate the adjustment in Figure 16 marked "VERT. LIN" in Figure 16. (This adjustment is needed if circles on the screen appear distorted.) Adjust in small increments using a very fine screwdriver.

Adjust Horizontal Size

8. Because the Argus screen most closely resembles a television on its side, the horizontal (side to side) size is controlled by the potentiometer marked "VERT. SIZE." Adjust in small increments using a very fine screwdriver.

Adjust Focus

9. Locate the adjustment in Figure 16 marked "FOCUS." Use a very fine screwdriver to first turn the adjustment counter-clockwise. (That is the more common direction for this adjustment.) If necessary, turn the adjustment in a clockwise direction. Adjust until the image on the screen is the sharpest.

Replace Panel

10. After making necessary adjustments, turn the unit off and disconnect it from the power source.
11. Replace the panel and secure it in place with the appropriate screws.