Appendix H
Electronics Description for CF2 Controller

Controller Electronics Stack

Sediment Trap firmware version PST-3_00 and higher supports either the CF2 or TT8 microcontroller. The system power up shows which Micro Controller is installed (Figure H-1).

CF2 Micro Controller Installed →

```
TOM8>g

jumping to address 00000008

 ><((((°>¸.·´¯`·.¸><((((°>`·.¸¸¸.·´¯><((((°>`·.¸¸¸.·´¯><((((°>

CF2-PST-3_00 R0 L1.6 | PST-3_01.c compiled May  5 2011 at 12:14

 Clock reads 05/12/11 11:18:31
 Change time & date (Yes/No) [N] ? :
```

Figure H-1: Power-Up Status Shows CF2 or TT8

Sediment Trap CF2 electronics have a three board stack (see Figure H-2) mounted on the chassis plate between the controller housing end cap and the battery holder. An AUX Stepper Board controls power, communications and the stepper motor, a Micro Controller board has a low power data logger, and a Micro Controller Interface board controls the signals from the CF2 Micro Controller to the Aux Stepper board.

Figure H-2: Sediment Trap – Electronics Stack

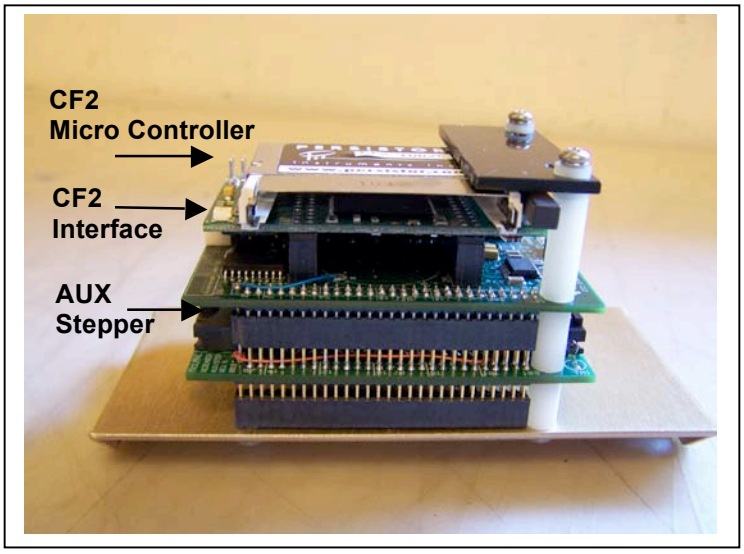
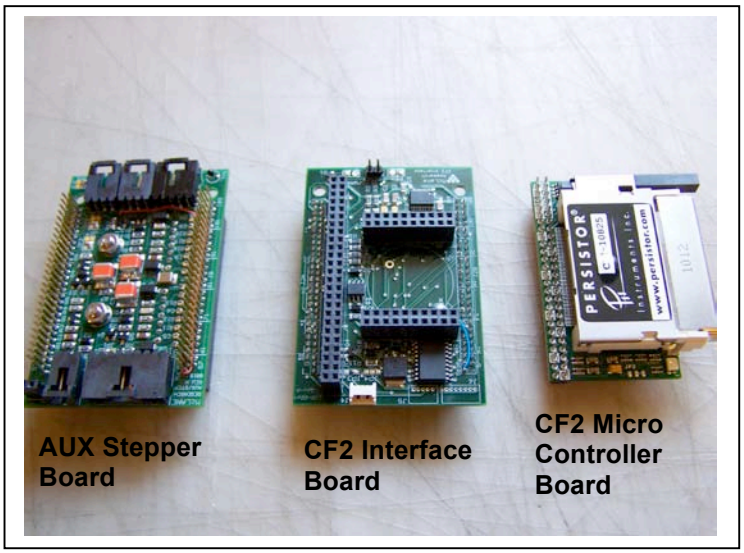


Figure H-3: Controller Boards



IMPORTANT
Follow standard electrostatic discharge (ESD) precautions when handling the electronics.

CF2 Interface Board

The CF2 Interface board controls the signals from the CF2 Micro Controller to the Aux Stepper board. The Board also has an 8 channel, 12-bit 100 KHz A/D converter. If optional sensors are installed, the Interface board controls power and communication to the sensors. If installed, the pressure sensor requires an instrumentation amplifier, which is also located on the CF2 Interface board.

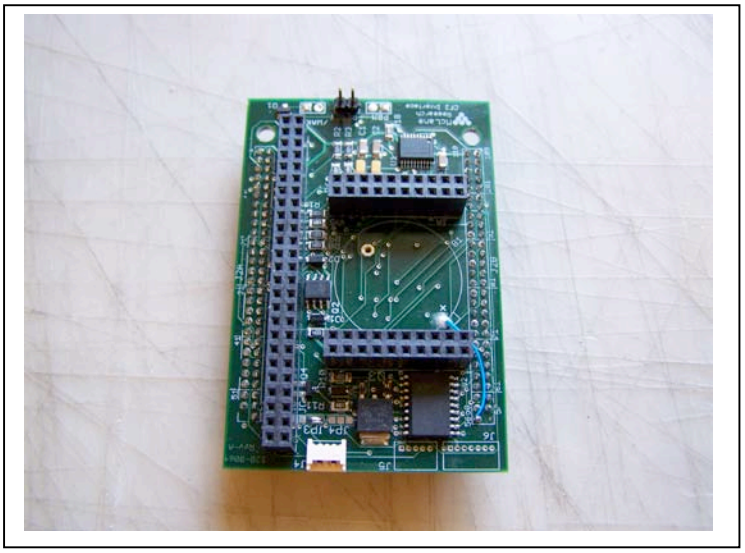


Figure H-4: CF2 Interface Board

CF2 Micro Controller Board

The single-board data logger is a Persistor model CF2 Micro Controller. The CF2 board includes serial communication ports, digital, and timing interfaces. A PIC 16C64 microcontroller serves as a programmable clock, non-volatile flash memory, and RAM storage of the primary data file (the recorded time history of rotation events). Non-volatile EEPROM backup records all of the data acquired each time the rotator is advanced.

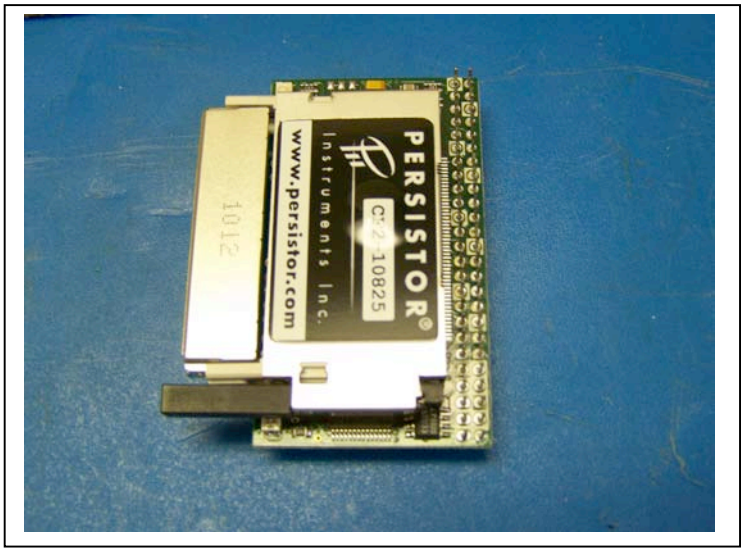


Figure H-5: CF2 Micro Controller Board

AUX Stepper Motor Circuit Board

The AUX Stepper motor circuit board controls power, communications, and the stepper motor. The following connectors are located on the top of the stepper driver board:

- Amp MTE 2-pin for the main battery (J2)
- Amp MTE 8-pin for the stepper motor (J3)
- Amp MTE 4-pin for the communications (J6)
- Amp MTE 3-pin (note pin-2 is keyed) for the AAA battery backup
- Molex MTE 3-pin for trigger (J5)

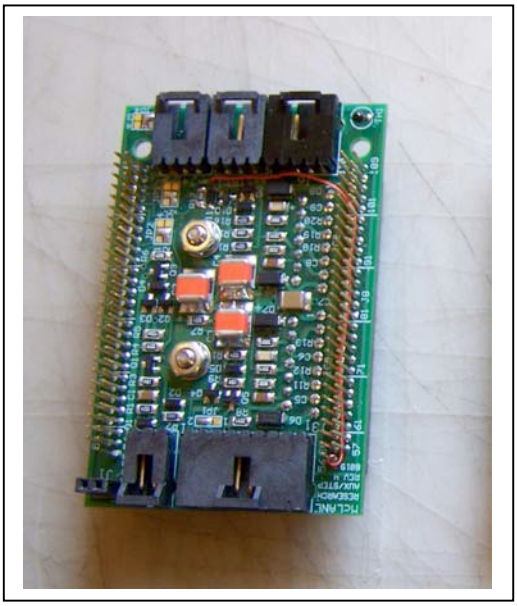


Figure H-6: Aux Stepper Board

Compass/Tilt Sensor Board

If installed, an optional Compass/Tilt Sensor can provide a time history of tilt magnitude and direction. The CF2 Interface board controls power and communication to the Compass/Tilt Sensor board (see Figure H-7). For more information, see Appendix B, "Optional Compass/Tilt Sensor" in this User Manual.

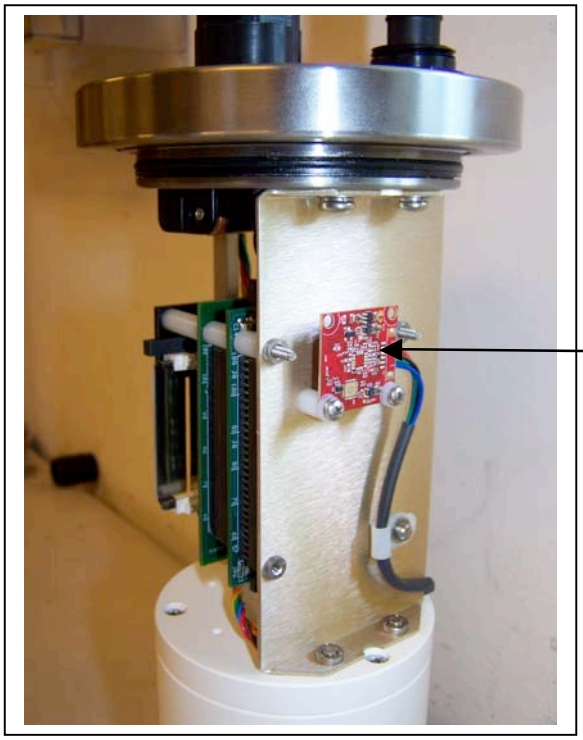


Figure H-7: Compass Tilt Sensor Board

NOTE
If the Compass/Tilt sensor is installed with the CF2 Controller board, the tilt history is stored in the file TILT.DAT. EEPROM includes every record from the tilt time history.

Battery Connection/Powering on the Trap

Connecting and disconnecting the battery is the only way to power the Sediment Trap electronics on and off. The Micro Controller automatically starts when the main battery is connected. To operate the electronics, connect to an external PC with a communications protocol set to 9600 baud, 8 data bits, 1 stop bit, and no parity.

The main battery pack is a white, PVC plastic cylinder that holds 14 "C" cell alkaline batteries. A new set of batteries provides at least 21 volts with 5Ah capacity. The main batteries are connected to each other in series via two circuit boards internal to the battery housing. The positive and negative terminators of the main battery assembly are fed through the top cap of the assembly for connection to the electronics assembly.

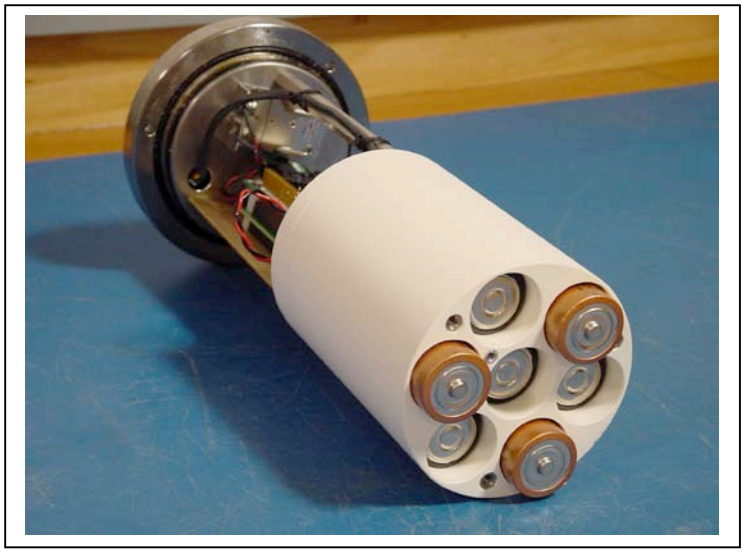


Figure H-8: Sediment Trap Main Battery Pack

The backup battery consists of two “AAA” cell alkaline batteries. A new set of batteries provides at least 3 volts.

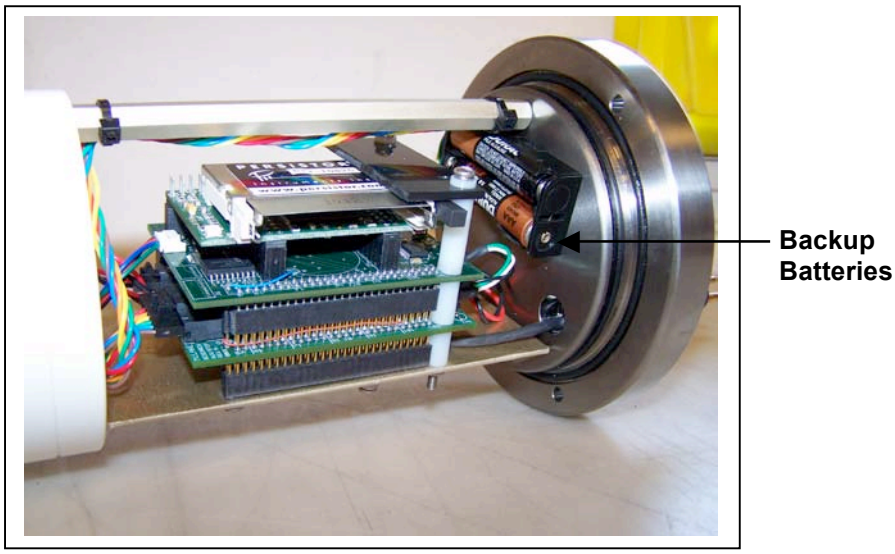


Figure H-9: Sediment Trap Backup Batteries

To power on the Sediment Trap and connect to a PC, complete the following steps:

1. Boot the operator PC and start the communications software.
2. Place the Trap in a dry area and open the controller housing by unscrewing the three (3) bolts from the end cap (the cap with the connectors mounted to it).
3. Pull the end cap straight out from the cylinder. The controller, computer, and batteries are mounted to this end cap.
4. Connect the main battery to the battery connector on the controller housing (see H-10).

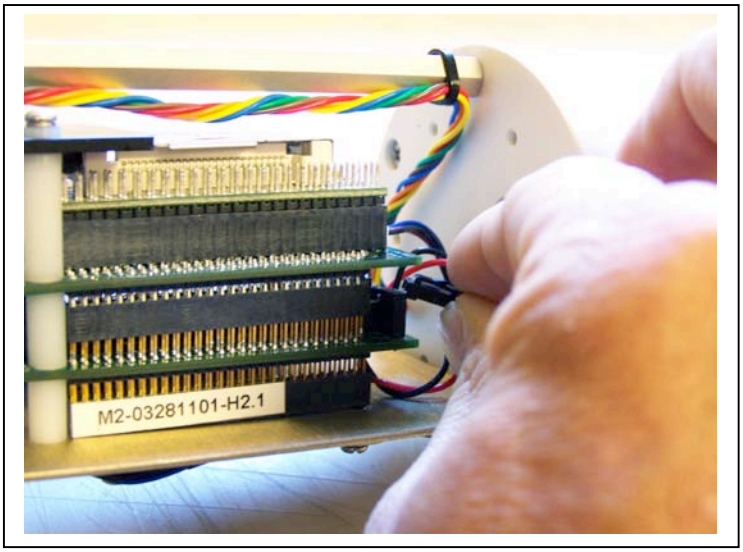


Figure H-10: Connecting the Battery

5. Install the backup batteries in the holder (see Figure H-9).

IMPORTANT
Install the backup batteries in the correct direction.

6. Slide the end cap back into the cylinder and close the controller housing, ensuring that the o-rings are correctly seated to prevent water leakage.
7. Secure the end cap with the three (3) bolts and tighten with a hex driver (included in the Toolkit) until the lock washers flatten.

NOTE
Do not overtighten bolts.

8. Remove the dummy plug from the COM connector on the controller housing end cap.
9. Attach the communication cable (supplied in the Toolkit) to the PC serial port first and then to the COM connector.

IMPORTANT
Always make and break the COM connection at the controller housing rather than the PC serial port to avoid crashing the Controller.

10. Press [CTRL]-[C] three times to display the Main Menu.

NOTE
If the Main Menu does not display, check the COM port connection and confirm the communication protocol settings (9600 baud, 8 data bits, 1 stop bit, and no parity).

11. Before disconnecting power, press [CTRL]-[C] to return to the Main Menu and select Sleep.

NOTE

Persistor has two power saving modes – 'Suspend' and 'Sleep'. 'Suspend uses the lowest power and is triggered whenever power savings are required such as when 'Sleep' is selected from the Main Menu (see Figure H-11). If the firmware does not have time to enter 'Suspend' mode, the Controller goes into 'Sleep' mode, which uses low power.

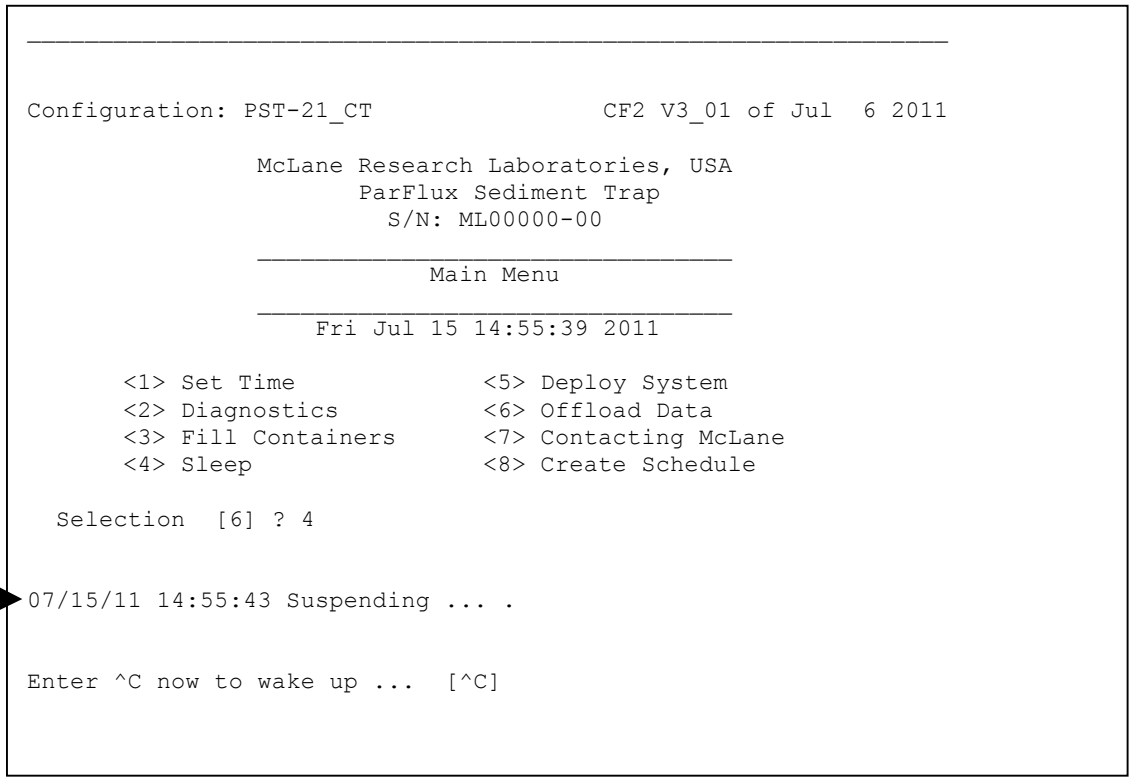


Figure H-11: 'Suspend' Mode Saves Power