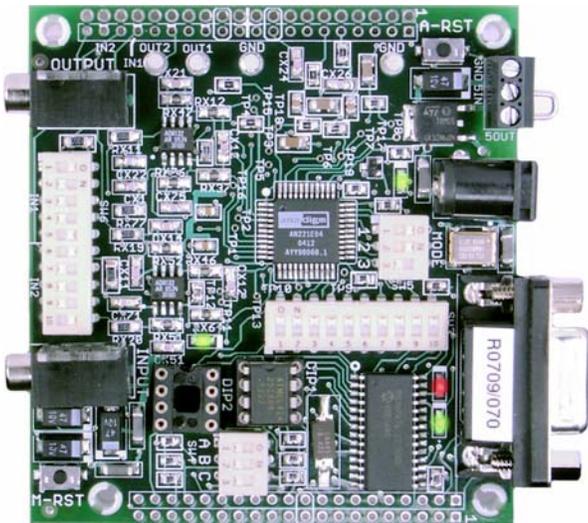


Programmable Analog Module



PAM-5002R Series

- Fully supported Anadigmvortex Programmable Analog Signal Processor
- 6 analog inputs and 3 outputs
- On-board +/- 5V power supplies
- RS-232 serial interface to host
- Operates from host computer or EEPROM
- Fully compatible with AnadigmDesigner2 CAD software (available free from Anadigm)
- Use for engineering demos or install as a system module in a larger product
- Ideal for university level electrical engineering classes and projects
- Instructional materials from Servenger website or Pearson/Prentice-Hall

Quick Start Guide

Obtaining the AnadigmDesigner[®] 2 software and installing on a PC:

To get a Trial copy of the software:

Step 1. Go to www.anadigm.com and click on the **FREE SOFTWARE DOWNLOAD** button.

Look for this →



Step 2. A typical web account registration process will start. Enter a UserID and Password to use the website and download AnadigmDesigner[®]2. Save the account information, complete the registration, download and save the software. Anadigm will email a License ID and License Key.

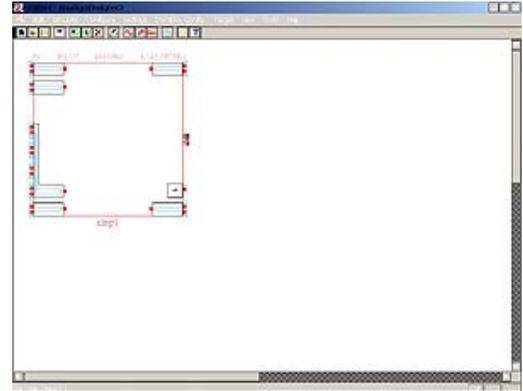
Step 3. Double click on the saved Setup file to start the installation process. A typical Install Wizard will appear. Use the web account information and **Trial** as the License Key or the full License ID and License Key if available from Anadigm. The Install Wizard will conclude with a check box to **Launch AnadigmDesigner2**. Click **Finish**.

Setting up the Programmable Analog Module (PAM) for AnadigmDesigner2:

Needed:

- AnadigmDesigner2 (referred to as “AD2”) computer aided design (CAD) software installed on a Microsoft Windows[®] based PC.

Looks like this when running →



- DB-9 RS-232 Serial Cable (see **Advisories** on last page about USB-to-Serial adapters).
- DC power source: Use either
 - A typical 9VDC output, 1200 mA or larger capacity, AC wall plug power adapter fitted with a 2.1 mm ID x 5.5 mm OD output connector wired as CENTER POSITIVE, or
 - A low noise +5V bench power supply
- Typical set of powered desktop PC stereo speakers with the 3.5 mm stereo plug connector.

Step 1. Connect the DC power source, either using the +9VDC power adapter or a +5VDC bench supply:

A. Using the supplied +9VDC power adapter per the left side photo below:

- 1) Plug the power unit into the AC outlet and connect into the DC Power Jack on the PAM.
- 2) Make sure the metal clip connecting 5VOUT to 5VIN is installed (per arrow).

B. Using a +5VDC bench power supply connected per the right side photo below:

- 1) Remove the metal clip connecting 5VOUT to 5VIN (per arrow).
- 2) Install GND and +5VDC wire connections to the power terminal per the photo



In both cases the green **+5V ON** LED near the DC Power Jack should be ON continuously.

Step 2. Press the Master Reset pushbutton (labeled M-RST) in the corner of the PCB opposite the power terminal. The two LEDs near the DB-9 connector should flash red and then green in succession.

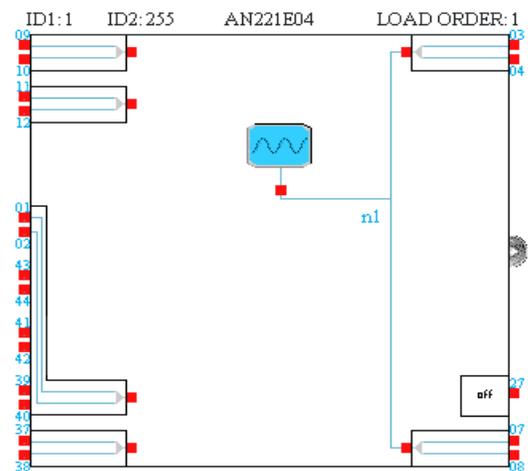
Step 3. Connect the Serial Cable from the PC to the RS-232 DB-9 port on the PAM

Step 4. Connect the 3.5 mm stereo cable from the PC speakers into the stereo Output jack (labeled **OUTPUT**). Make sure the PC speakers have power and are turned on.

Creating and downloading a sample audio signal source:

- Step 1.** Every time AD2 starts up a small window will appear asking which Anadigm chip to use. Look at the small lettering in the center of the space above the square design area window which should say AN221E04. If yes then select the **Continue with default chip** button and proceed. If some other part number shows then select the **Choose a different chip** button and change to AN221E04.
- Step 2.** Point to the pull down menu under **Settings** and select **Preferences**. The Chip Type should be AN221E04 as established above. Select the **Port** tab and then activate the **Select Port** pull down option arrow to show the available options. In general, **COM1** is the best choice but this is PC dependent. Select **COM1** for now, select the **Apply** button and then **OK**. If Step 3 below does not work then select another COM port option and try Step 3 again. Be sure the serial cable is secure.
- Step 3.** Start AD2 and select **Target > Display Board Information**. A window will appear with the PAM software version and the part number of the Anadigm IC used (AN221E04). Click **OK**.
- Step 4.** Select **Edit > Insert New CAM**. CAM means “Configurable Analog Module” which is the AD2 name for the pre-defined analog functions. The index to the library of CAMs will be displayed. Point to and double click the Sinewave Oscillator CAM which will appear attached to the tip of the cursor. Drag it into the AD2 design area and click once to drop it.
- Step 5.** The parameter set up window specific to this CAM will appear. Click **OK** to accept defaults.
- Step 6.** Select **Settings > Active Chip Settings > Clocks** to adjust the system clock parameters. Point to **Clock 1** setting and use the LEFT/RIGHT slider to set this clock to be divided by **400** times from the system clock frequency to be **40.0 kHz**. Leave all other clock settings unchanged and click **OK**.
- Step 7.** Point to the Sinewave Oscillator CAM icon, right click and select **CAM Settings**. Set the parameters as follows to achieve **440 Hz (0.44 kHz)** oscillator output:
- Point to **Clock A** and use the pull down option arrow to select **Clock 1** (at **40 kHz**)
 - Point to the **Osc. Frequency** value window (temporarily red), enter **0.44** and then **OK**
 - Point to the **Peak Amplitude** value window to confirm **3.6 Volts** (default) and then **OK**.

- Step 8.** Point to the red output port below the Sinewave Oscillator CAM icon and watch the wiring tool pointer appear. Drag the pointer to the upper right output port and release to set the wire. Point to any place along the new blue wire just installed to start a new wire branching off of this wire. Drag the pointer to the lower right output port and release to set the wire. There should now be connections between the output port of the Sinewave Oscillator and the two output ports of the Anadigm IC. The wire just created is labeled “n1”.



- Step 9.** Point to the **Download** icon (it has a blue downward pointing arrow). Click once to download the configuration file representing this design into the Anadigm IC on the PAM. The PAM should show three green LEDs as ON with the 440 Hz Tuning-A tone coming out of the speakers. The green LED next to DIP2 socket indicates that a correct Anadigm configuration download has been completed and the analog signal processing is running.
- Step 10.** The voltage output waveforms can be observed at the terminal posts labeled OUT1 and OUT2.

Storing a copy of the downloaded configuration file in the on-board EEPROM:

As shipped the PAM-5002R will download configuration files directly into the Anadigm IC. To format and store a configuration file into the supplied EEPROM for the Anadigmvortex static configuration mode (MODE = 1) set Switch 4 – 3 (labeled “C”) to the ON position. Configuration downloads will proceed as before (a bit slower) but a reformatted version of the configuration file will be put into the SPI serial EEPROM installed in the socket labeled ‘DIP1’. To demonstrate the stored contents of the EEPROM:

- Disconnect the power and remove the RS-232 cable
- Relocate the EEPROM to the socket labeled ‘DIP2’
- Set all 10 switches in Switch 3 to OFF to isolate the Anadigm IC from the microprocessor
- Set Switch 5 (labeled ‘MODE’) to OFF – OFF – ON (1 = OFF, 2 = OFF, 3 = ON)
- Reconnect the power.

The configuration file stored in the EEPROM to create the 440 Hz Tuning A will be immediately loaded into the Anadigm IC and the tone will appear at the speakers. This process will repeat after every power up and after the Analog Reset pushbutton is pressed and released.

Advisories about USB-to-Serial adapters, flow control and restarting the AD2:

#1 – Use of the Servenger PAM-5002R is not recommended with USB-to-Serial adapters. However if your PC has only a USB port and no Serial port you may try to use a USB-to-Serial adapter device. No USB-to-serial adapter product is recommended as more likely to succeed than another. An adapter that worked last year with one particular PC is not guaranteed to work purchased new this year nor to work with another PC. Please demonstrate success with your PC before committing to purchase. Selecting between Software and Hardware flow control options per #2 below may be helpful.

*#2 – As shipped, the PAM-5002R is set to use RS-232 **SOFTWARE** flow control (XON-XOFF command character protocol) to be compatible with most desktop PCs. You can experiment with **HARDWARE** flow control (CTS-RTS signal line handshake) to see if this works better for your equipment by setting Switch 4 – 2 (labeled “B”) to ON.*

#3 – If the RS-232 Serial cable is disconnected and then reconnected to the PAM after a configuration download, it may be necessary to save the AD2 design file and then close and restart the AD2 software to restore the logical connection between AD2 and the microprocessor on the PAM.

See the Servenger website at www.servenger.com to download the Technical User Manual.

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Limitations of Liability Statement: The PAM-5002 series Programmable Analog Modules are designed to show the capabilities of the programmable analog signal processor products of Anadigm, Inc. They can also be installed per the instructions provided to function as part of a larger electronic system. Connected to a UL, CSA or ETL listed external power supply, the PAM-5002 series products are believed to conform to the Safety Extra Low Voltage (SELV) device classification of the UL and international electrical safety specifications but have not been formally qualified as such. No VDE/CE conformance is specifically claimed. The PAM-5002 series products are guaranteed to function correctly for the advertised use for 1 year from date of purchase. Performance under this guarantee is limited to repair or a like-for-like replacement with the same or equivalent product then in production. In no case will responsibilities for damages be accepted for a greater amount than the purchase price and in no case for consequential or secondary damages resulting from the use of the PAM-5002 series products or any other Servenger products. No Servenger product including this one is to be used in any application where there is a risk that a malfunction may result in any degree of human injury or in death.

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