

Instruction Manual

SAAXYZ Basic Usage Guide



Notices

Measurand shall have no liability for incidental or consequential damages of any kind arising out of the sale, installation, or use of its products. Please read this document and any notes and instructions carefully before proceeding with installation and operation.

ShapeAccelArray is covered by patents including: 6127672, 6563107, 7296363, WO 02/055958, WO 02/055958, WO 98/41815 and others pending.

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1. Introduction

The SAAXYZ is a simple microprocessor interface to Measurand’s ShapeAccelArray (SAA) devices. It allows the user to get Cartesian XYZ position data directly out of the SAA.

Figures 1 and 2 illustrate how the SAAXYZ can be used with either a single SAA or up to five SAAs at once.

This document describes the binary communications protocols that are used for controlling, getting status information, and getting data from Measurand’s SAAXYZ device.

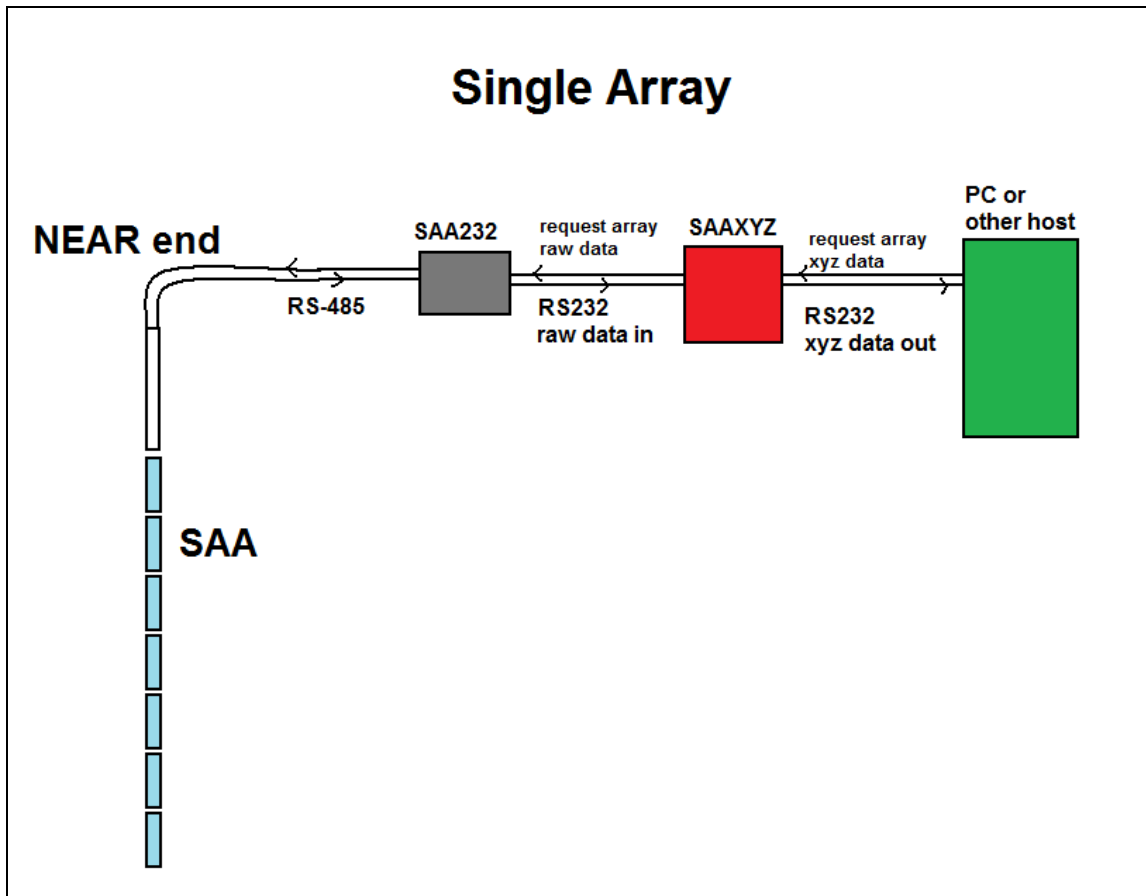


Figure 1. Diagram illustrating how the SAAXYZ is used with a single SAA. An SAA232 is required for controlling power to the array, surge protection, and RS-232 to RS-485 conversion.

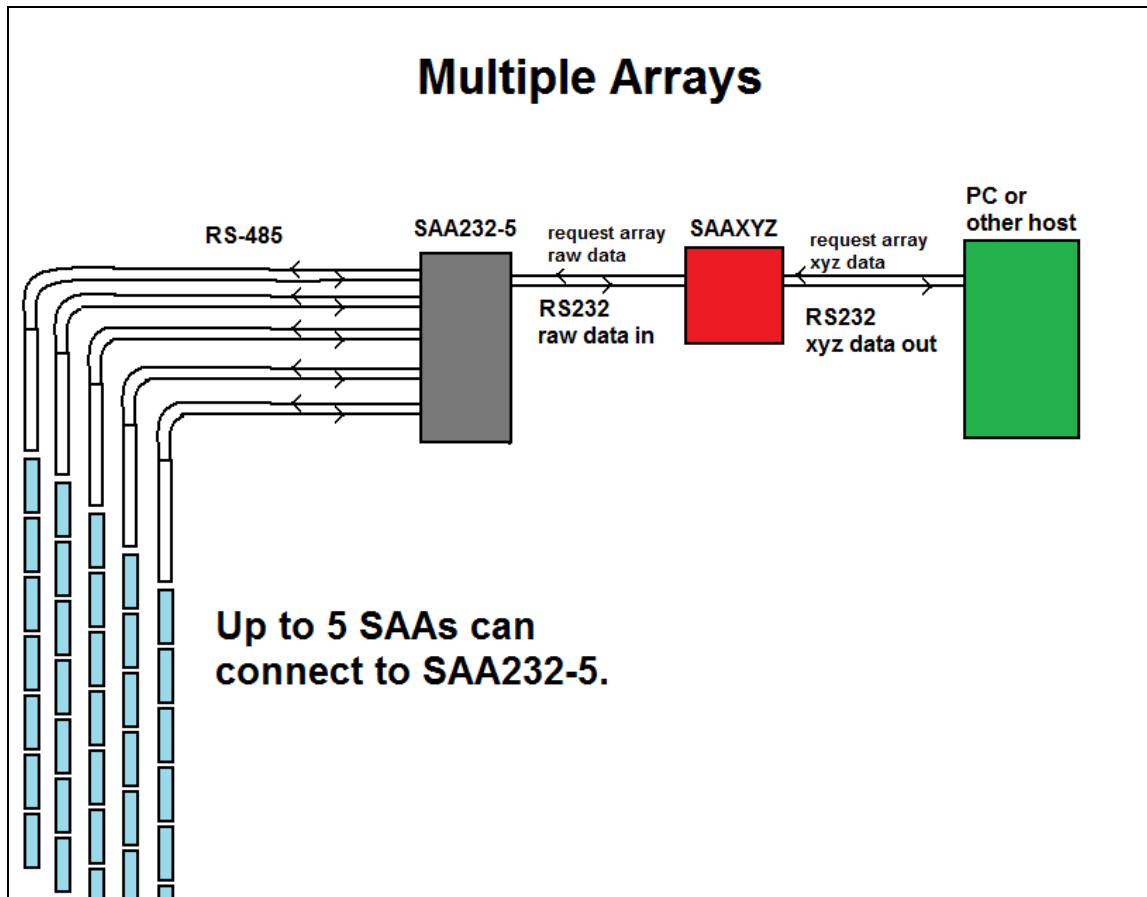


Figure 2. Diagram illustrating how the SAAXYZ is used with multiple (up to five) SAAs. An SAA232-5 is required for switching power to the arrays, surge protection, and RS-232 to RS-485 conversion.

3. Steps For Using SAAXYZ

- 1) Connect serial cable from SAAXYZ to PC or other host that you are using to collect data. For testing, you may wish to use a terminal program on a PC (“TeraTerm” available at: <http://www.tucows.com/preview/195282> is a nice reliable terminal program) to test out the connection to the SAAXYZ. The PC serial port should be configured for 38400 bps, 8 data bits, no parity, one stop bit, and no hardware handshaking.
- 2) Connect short wire link from SAAXYZ (serial port C) to SAA232 if a single SAA is being used, or to the SAA232-5 if more than one SAA is being used.
- 3) Start terminal software on PC.
- 4) Plug +12V power into SAAXYZ.

You should then observe something like the following in the terminal software:

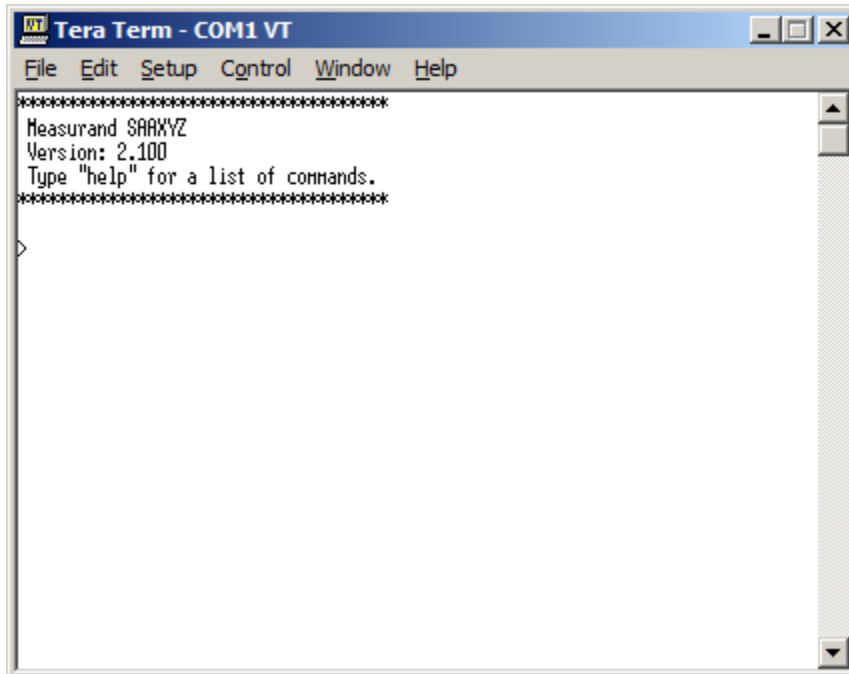


Figure 3. Terminal output from SAAXYZ after powerup.

Type help for a list of commands:

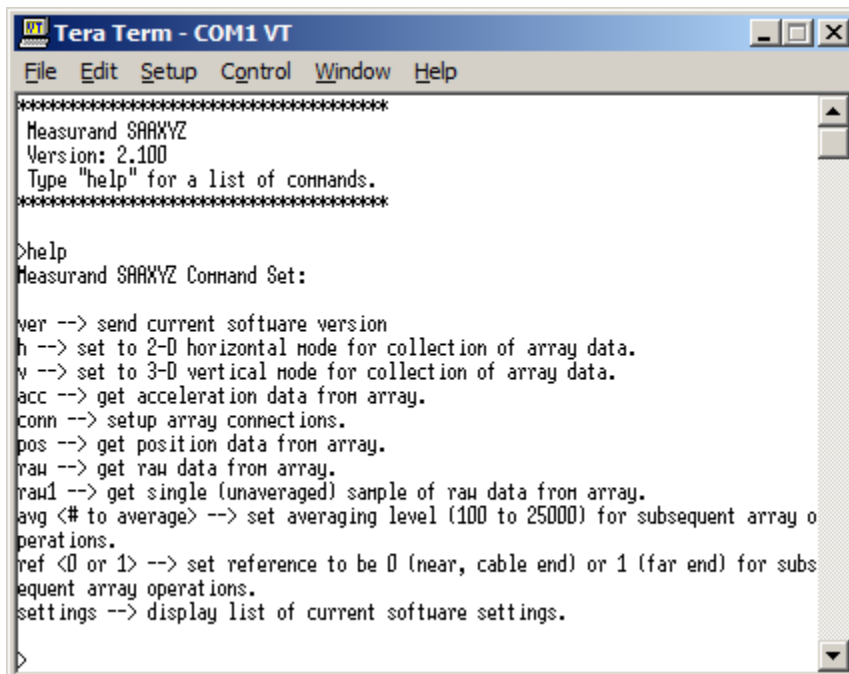


Figure 4. List of commands available in SAAXYZ version 2.100.

4. SAAXYZ Commands

The following lists the output that can be expected for each of the SAAXYZ commands. Note that each command string must be followed by a carriage return and/or linefeed character.

ver

This command sends the current SAAXYZ software version. The output will be an ASCII string of the form:

version: x.xxx<CR><LF>

ex:

version: 2.100<CR><LF>

h

This command sets all subsequent calculations to use the 2-D horizontal mode of operation for the array. The SAAXYZ responds with the following message after the 'h' command is sent:

Horizontal Mode<CR><LF>

v

This command sets all subsequent calculations to use the 3-D vertical mode of operation for the array. The SAAXYZ responds with the following message after the 'v' command is sent:

Vertical Mode<CR><LF>

acc

Requests acceleration data for all links of connected arrays. The raw data used to compute accelerations is averaged by the averaging level previously defined using the "avg" command. The output from the SAAXYZ appears as follows:

Acc Data (AIA Mode) For Array #XXXXXX:<CR><LF>

X_ACC(g), Y_ACC(g), Z_ACC(g)<CR><LF>

accX1, accY1, accZ1<CR><LF>

accX2, accY2, accZ2<CR><LF>

accX3, accY3, accZ3<CR><LF>

...

accXN, accYN, accZN<CR><LF>

where XXXXX is the serial number of the array, and N refers to the number of segments of the array.

conn

Prompts the user to choose whether or not the SAAXYZ is connected to an SAA232 or an SAA232-5 device. The SAA232 is used when interfacing to just a single SAA. The SAA232-5 can be used with up to five SAAs. If the SAA232-5 is selected, the user is prompted to enter or confirm the serial numbers of the arrays that are connected to the SAA232-5 ports.

pos

Requests position data for all segments of connected arrays. The raw data used to compute positions is averaged by the averaging level previously defined using the “avg” command. The output from the SAAXYZ appears as follows:

Pos Data For Array #XXXXX:<CR><LF>

X_POS(mm), Y_POS(mm), Z_POS(mm)<CR><LF>

posX0, posY0, posZ0<CR><LF>

posX1, posY1, posZ1<CR><LF>

posX2, posY2, posZ2<CR><LF>

posX3, posY3, posZ3<CR><LF>

...

posXN, posYN, posZN<CR><LF>

where XXXXX is the serial number of the array, and N refers to the number of segments of the array.

raw

Requests raw data from all links of connected arrays. The raw data is averaged by the averaging level previously defined using the “avg” command. The output from the SAAXYZ appears as follows:

Raw Data (AIA Mode) For Array #XXXXX:<CR><LF>

X_counts, Y_counts, Z_counts<CR><LF>

rawX1, rawY1, rawZ1<CR><LF>

rawX2, rawY2, rawZ2<CR><LF>

rawX3, rawY3, rawZ3<CR><LF>

...

rawXN, rawYN, rawZN<CR><LF>

where XXXXX is the serial number of the array, and N refers to the number of segments of the array.

raw1

Gets a single sample of raw data from all connected arrays. The output from the SAAXYZ appears as follows:

Raw Data For Array #XXXXX:

X_counts, Y_counts, Z_counts

rawX1, rawY1, rawZ1<CR><LF>

rawX2, rawY2, rawZ2<CR><LF>

rawX3, rawY3, rawZ3<CR><LF>

...

rawXN, rawYN, rawZN<CR><LF>

where XXXXX is the serial number of the array, and N refers to the number of segments of the array.

avg <# to average>

Sets the averaging level of the SAAXYZ for all subsequent array calculations. The averaging level must be set to a value between 100 and 25500, and must be a multiple of 100. The SAAXYZ responds with the following if averaging is set successfully:

Averaging set to: XXXX samples

where XXXX is a number between 100 and 25500.

ref <0 or 1>

Sets the reference end of the array for subsequent calculations. Use “ref 0” to set the reference to be at the near end of the array, and use “ref 1” to set the reference to be at the far end of the array. The SAAXYZ responds with the following if “ref 0” is used:

Reference set to near (cable end) mode.<CR><LF>

or if “ref 1” is used:

Reference set to far mode.<CR><LF>

settings

Displays a list of the settings that are currently being used on the SAAXYZ. An example of these settings appears below:

number of arrays: 1

array serial numbers: 47327

total number of octets: 3

octet serial numbers: 47327, 47643, 47662

averaging level: 1000 samples

reference: FAR

mode: 3-D Vertical

interface: SAA

5. SAAXYZ Setup

In order to install new calibration files on the SAAXYZ or upgrade the firmware on the SAAXYZ, the “SAAXYZ Setup” software must be installed. **Figure 5** shows a screenshot of the SAAXYZ Setup software:

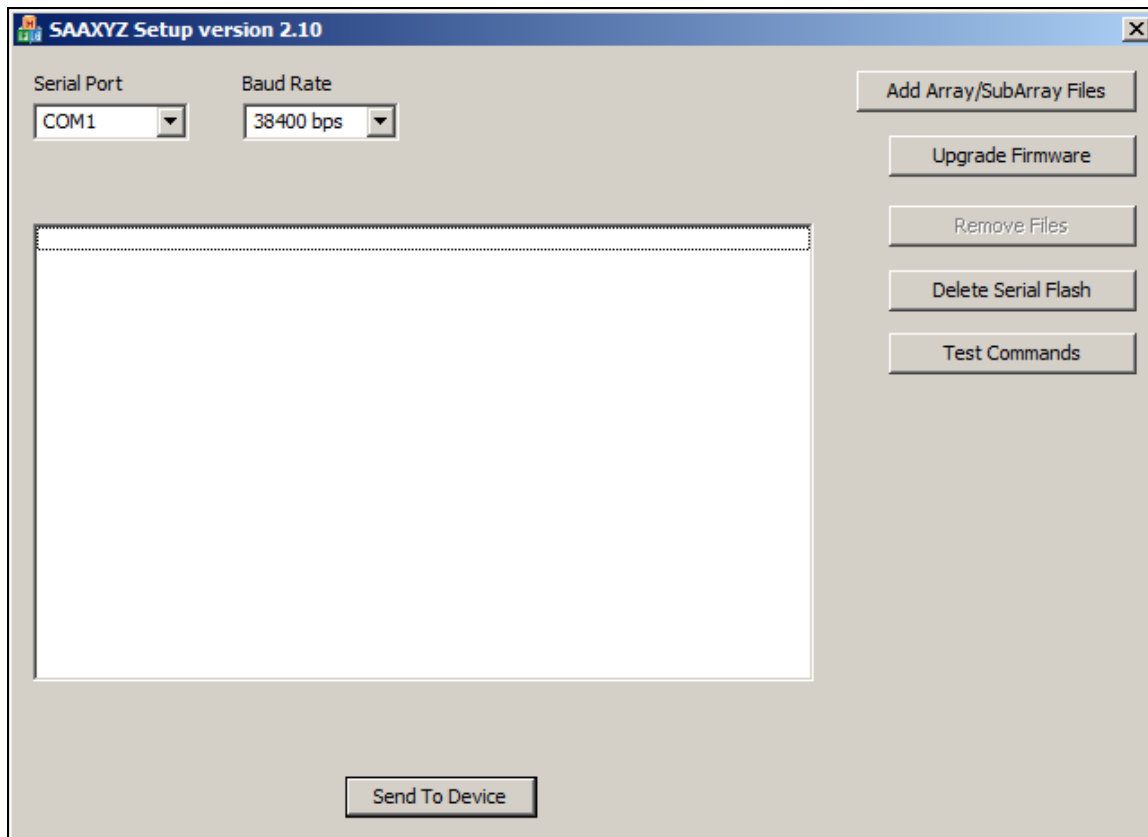


Figure 5. SAAXYZ Setup software. Used to upload calibration files or new firmware to the SAAXYZ.

(Note: You should not be running the terminal software at the same time that you are running the SAAXYZ Setup program, since they use the same serial link to the SAAXYZ device.)

If old calibration files are present on the SAAXYZ, they should be removed using the “Delete Serial Flash” button, prior to installing the new calibration files. It takes approximately 2 minutes to delete the entire serial flash of the SAAXYZ.

If you are using the SAAXYZ with a new array, you must press the “Add Array/SubArray Files” button to select the array AND subarray files for that array. Then press the “Send To Device” button to send those files to the SAAXYZ.

If you need to upgrade the firmware of the SAAXYZ to a new version, you should press the “Upgrade Firmware” button, and then select the appropriate .BIN file to send to the SAAXYZ. Once the upload of the new firmware has been completed, the SAAXYZ will automatically reboot itself with the new version after about two seconds.