**ASD/QMS**
Advanced Systems & Designs
Greystone Industries LLC

# Operating Manual

# GageMux®USB
## 2, 4 & 8 Input Gage Interface

Document No. 500-20_40_80

# GageMux® USB

*Models:*
*500-20-USB(RS232+USB)*
*500-40-USB(RS232+USB)*
*500-80-USB(RS232+USB)*
*500-40-USB-KB(RS232+USB+Keyboard outputs)*
*500-40-USB-KB(RS232+USB+Keyboard outputs)*
*500-80-USB-KB (RS232+USB+Keyboard outputs)*

# Operating Manual

**Table of Contents**

## Introduction

The GageMux® USB is a device which allows you to connect two (2), four (4), or (8) eight digital gages to a USB port or to a single RS-232 serial port or USB Keyboard on any desktop computer, notebook computer, printer, or other serial device.

The GageMux® USB will work with gages that have Digimatic outputs such as Mitutoyo digital gages. You can connect any brand of gage or RS232 device to the GageMux® USB using direct gage cables or the ASDQMS FlashCable®. The direct gage cables include standard gage cables manufactured by Mitutoyo Corporation, or any other gage cable compatible with Mitutoyo Digimatic output. Other types of gages and RS232 serial devices can be connected to the GageMux® using our configurable FlashCable®.

The GageMux® USB is configured through internal rotary switches, commands from a host computer, or using the internal E-commands programming. These commands include:

- Request a reading from a channel.
- Change the setup of a channel.
- Change the output string mode.
- Change to Keyboard output mode.
- Change the foot switch mode.
- Save mode settings permanently
- Reset the GageMux® USB.
- Verify Settings.

Readings are initiated by pressing a read button on the gage, pressing a remote switch inserted into the foot switch jack, or a host command.

Follow the instructions in this guide to:

- Install and configure the GageMux® USB to communicate with your gages in the desired mode.
- Connect the GageMux® USB to your gages or FlashCable®.
- Interface the GageMux® USB to your computer, and assist in the configuration of your SPC software.

**Features**

- Rugged design, built to withstand harsh shop-floor conditions.
- Support for gages from over 400 different manufacturers.
- Two operating modes, Static (Normal) mode operation, and Dynamic (MIN/MAX/TIR — minimum / maximum / total indicator run-out).
- Individual, single-trigger or global foot switch mode operation.
- Set modes using rotary switches, E-commands or temporary host commands
- 2 and 4-port GageMux® configured for USB powered
- Green and Red LED for each port to indicate status
- Host command operation and setup
- USB 2.0 specification compatibility
- RS-232 output
- USB 2.0 Keyboard output (optional)
- Ability to switch between USB, RS-232, & USB Keyboard output mode
- Daisy chain multiple GageMux® USB units to connect up to 99 digital gages
- LED power indicator
- LED to indicate output mode selected
- RS-232 pass-thru port
- Allows for upgrade to 8-Port Model and / or Keyboard output model

**Included Items**

A complete GageMux® USB system includes the following items:

- GageMux® USB 2, 4, or 8-Port
- Operating manual
- Flash Drive with updated drivers and information
- USB cable
- 9-volt DC power adaptor for 8-port the GageMux®

**System Requirements**

Before you begin to setup and install the GageMux® USB interface, we recommend that you first check to see that you have the following components:

- GageMux® USB gage interface
- Computer with USB Port or RS-232 serial port
- Standard USB cable (included) or RS-232 serial cable to connect GageMux® USB to external device
- 9-volt power supply (required for 8-port)
- One or more digital gage and matching gage cable
- Footswitch for gages without a send button (not included)

## GageMux® USB Quick Start

Below are diagrams that show the front and rear panels of the GageMux® USB.



Foot Switch Jack for each Port          Green Gage Reading                    Power LED
                                           Red LED for Gage Error    Gage Input
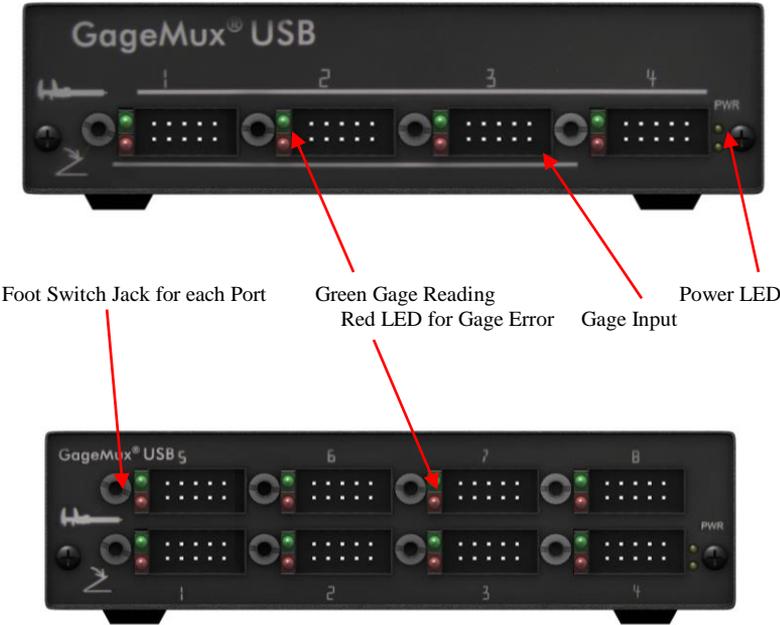
**Figure 1; GageMux® 4 & 8 Port USB Front Panel**

*The front panel has 2, 4, or 8 ports and Power LED.  Each port has its own green / red indicator light, 2.5mm foot switch jack for a standard contact closure switch, and a 10-pin gage connector.*

Reset Pushbutton        USB Output                    RS232 Output        9 volt DC Supply Jack
                        Daisy Chain/Pass Thru Port
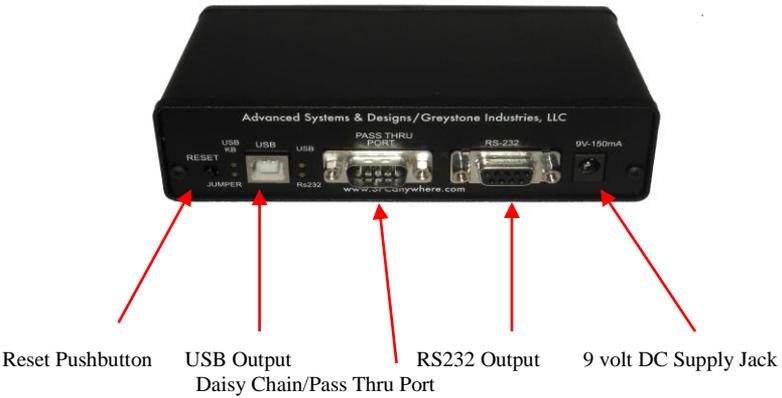
**Figure 2; GageMux® USB Rear Panel**

*The rear panel has three components:  The pushbutton reset switch, one USB male connector, one 9- pin female RS-232 serial connector, another 9 pin male RS-232 pass-thru connector, LED lights for each output mode (USB, RS232, and USB Keyboard), USB Power and the 9 volt power supply jack.*

### Basic Operation

The basic operation of the GageMux® USB is straightforward.   The following steps demonstrate the standard method to get your GageMux® running:

1.  Out of the box the unit is configured to run in Normal mode. You may change this mode by either changing the rotary switches or using the E-commands or temporary host commands. (See the "Configuration and Setup" section below for details).
2.  Connect one end of the USB cable to the PC and the other end to the GageMux USB.
3.  If you would like to use RS-232 connection, then connect a RS-232 serial cable to the serial device (i.e. computer or printer).
4.  Connect your gages and foot switches to the GageMux® USB.
5.  Connect the 9-volt DC power supply into the 8-port GageMux® USB and plug the power supply into a 110 volt AC outlet. The USB Cable included will provide power to the 2 & 4-port GageMux®.
6.  Press the reset button. On the ports with active gages the LED will light green. Inactive or empty ports will light the red LED.

**Driver Installation**

Note: Driver installation is generally required for Windows 98/98SE. Windows 2000, XP, Vista, Windows 7 and 8 should automatically install the USB drivers.  For some network systems, the USB driver can only be installed by the network system administrator. If the drivers don't install, you can use the USB file from the flash drive supplied with the GageMux, or go to www://SPCanywhere.com for driver download.

You can now use your gages with the GageMux® USB.  If you want to change a gage, use the following steps:

1. Disconnect and connect any gages as required
2. Press the reset button on the back of the GageMux® USB

**Configuration and Setup**

There are many ways to configure the GageMux® USB.  The features that can be modified by rotary switch settings or computer commands are:

- The output string format
- The footswitch operation
- Normal or MIN/MAX/TIR mode for each port
- The channel number
- The baud rate

Descriptions and instructions for each setting are described below.

**Setting Modes:**

- Rotary Switch settings
- E-Commands
- Temporary host commands

On GageMux® USB there is the option to use rotary switches or E-commands to set the mode. When using rotary switches or E-commands, the mode is stored even after the unit goes through power cycle unlike the temporary host commands. To use E-commands the jumper must be placed on pins J5/6 and hit reset button. To return to the rotary switch mode settings, hang the jumper from pin J5 only and hit the reset. See E-commands description on page 27.

Use the rotary switch table on page 23 for SW1, SW2 and SW3 to configure the preferred function or output. Host commands are similar to

E-commands. Modes can set using host commands but they are not saved after a power cycle.

**Switching between USB and RS-232 and Keyboard Output Mode**

On the GageMux® USB you have an option to use either the USB or RS-232 port for communication.

- **Switching between RS-232 and USB using rotary switches:**
  If you are plan to switch between USB and RS-232 using the rotary switches, make sure Jumper J5/6 is removed. Once the jumper is removed, set switch 1 for the desired output. Hit the reset button to activate the new setting.
- **Switching between RS-232 and USB using E-Commands:**
  If you are plan to switch between USB and RS-232 using the E-Commands, make sure Jumper J5 is placed between pin 5 and pin 6. Once the jumper is installed, set the GageMux to the appropriate output mode based on the E-command table. Hit the reset button to activate the new setting.
- **USB Keyboard Output Mode Option:**
  If the keyboard option board is installed and the USB Keyboard enabled, the keyboard output mode can be set by either using rotary switches or E-commands. Use the rotary switch table and E-commands table to set the mode. By default, the standard GageMux USB with keyboard option is set with keyboard output mode followed by a carriage return <CR>.

## Output String Format

The GageMux® USB can be configured for three different output string formats. Those readings are: Reading only, Full Comma-Delimited, and Mitutoyo Mux-10 format.

- **Reading Only Format**

  In the reading only format, the output string will look like this:

      SRRRRRRR<CR><LF>

  Where **S** is a space and **RRRRRRR** is the reading. It is followed by a carriage return and line feed. For example, a gage with an output of -1.234mm would look like:

```
        -1.2340<CR><LF>
```

- **Full Comma-Delimited Format**

  In the full comma-delimited format, the output string will look like this:

  ```
      NNN,SRRRRRRRR,SMMM,SCC<CR><LF>
  ```

  Where **NNN** is the reading number, **S** is a space, **RRRRRRRR** is the reading, **MMM** is the mode, (MIN, MAX, TIR, NRM), and **CC** is the channel number. It is followed by a carriage return and line feed. For example, a gage in normal mode, plugged into port 1 with two consecutive readings of –1.234mm would look like:

  ```
        001,   -1.2340, NRM, 01
        002,   -1.2340, NRM, 01
  ```

- **Mitutoyo Mux-10 Format**

  The Mitutoyo Mux-10 format consists of a string with up to 13 characters in it. It looks like this:

  ```
      0CASRRRRRRRR<CR>
  ```

  The first character is always **0**. **C** identifies the channel number. The third character is always **A**. **S** identifies the sign, which can be **+** or **-**. **RRRRRRRR** is the reading. For example, a gage plugged into port 1 with an output of –1.234mm would look like:

  ```
      01A-001.2340<CR>
  ```

## Foot Switch Operation

Described below are the modes of operation for the foot switch, Normal Foot Switch mode, Global Foot Switch mode, and Foot Switch Triggered mode.

- **Normal Foot Switch Mode**

  Each input is controlled by its own footswitch port on the GageMux® or gage send button.

- **Single Triggered Foot Switch Mode**

  Single trigger foot switch allows an operator to use one footswitch to trigger each gage reading sequentially. If the device or gage has a send button, and data is sent from the gage using the data send button, the GageMux® will see the data sent from the gage send button and move to the next gage in the sequence.

- **Armed Foot Switch Mode – Host Commands**

  Only the specified port in the data request is armed and can have data requested from it. A solid green LED displays the specified port. When a foot switch plugged into port 1 is closed (pressed), the channel specified in the host command will be triggered and the data requested. After the data is sent none of the channels are armed and no data can be requested until another command is received from the host computer. When multiple GageMux® units are daisy chained together, the footswitch in port 1 is used to request data from specified channel even if the channel is on different GageMux® box.

- **Global Foot Switch Mode**

  In global foot switch mode, any time a foot switch or gage send button is activated, all available GageMux® USB inputs will be scanned for a reading. When multiple GageMux® USB units are daisy-chained together, set all the backplane units to RS-232 as the output mode and to global footswitch mode**.**

## Normal and MIN/MAX/TIR Modes

The GageMux® USB can operate statically, or dynamically. When the GageMux® USB is operating statically, it is in Normal mode. When the GageMux® USB is operating dynamically, it is in MIN/MAX/TIR mode.

- **Normal Mode**

  In Normal mode, each foot switch press or host request causes the GageMux® USB to send a single reading from the gage connected to the corresponding port.

- **MIN/MAX/TIR Mode**

  In MIN/MAN/TIR mode, the first press of the footswitch or host request begins the scan of the gage. The second press of the footswitch or host request ends the scan and sends the MIN/MAX/TIR (minimum reading, maximum reading, and total indicator run-out) values to the output.

**Daisy Chaining**

Daisy Chaining connects several GageMux® USB in series, via a pass-thru port, and permits the user to connect up to 99 gages in the same work area. To do so, a DB-9 serial cable is connected to the daisy chain pass-thru port on the first GageMux and to the RS-232 port on the second GageMux. A third GageMux® unit, would be connected to the second GageMux pass-thru port to the RS-232 port of the third unit. The same layout would be used to continue to connect multiple units. The daisy chained units will use the RS-232 as data output mode instead of USB. Below is another look at the rear of the GageMux USB.



Reset Pushbutton    USB Output             RS232 Output     9 volt DC Supply Jack
                       Daisy Chain/Pass Thru Port

**Figure 3: GageMux® USB Rear Panel**

The user can connect the first GageMux to the PC with either the USB output or the RS232 output.

Connected to PC (USB or RS232)

**Daisy Chain Unit #1**

Connect unit #2 to unit #1 by connecting the RS-232 on #2 to the daisy chain pass-thru on unit #1

**Daisy Chain Unit #2**

Connect unit #3 to unit #2 by connecting the RS-232 on #3 to the daisy chain pass-thru on #2

**Daisy Chain Unit #3**

Continue to connect the rest of the daisy chain units as above. Power can be provided to each daisy chain unit through the serial RS-232 cables. One out of every five GageMux® for 4-port GageMux® or one out of every three GageMux® for 8-port GageMux® must have an AC/DC 9-volt power supply.

**RS232 Gage Pass-Thru Port Set Up**

The RS232/Pass-thru port of GageMux® USB can be used to act as a pass thru port directly connected for RS-232 gages. To configure the Pass Thru Port settings,

1) Open Hyper Terminal
2) Enter any Generic name
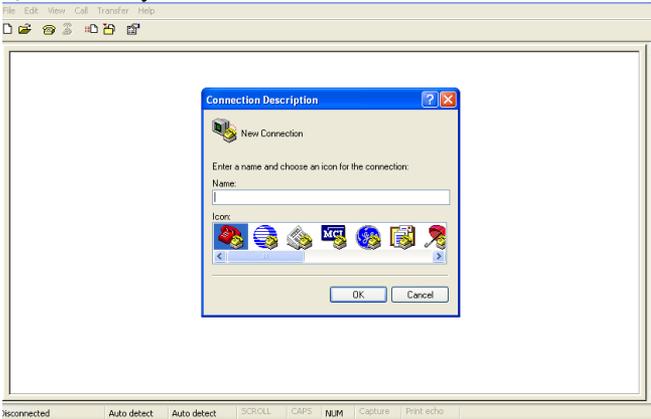


3) Select the proper COM Port
4) Ensure that the Port Settings are 9600 Bits per second, 8 Data bits, None Parity, 1 Stop Bits, and Flow Control to None
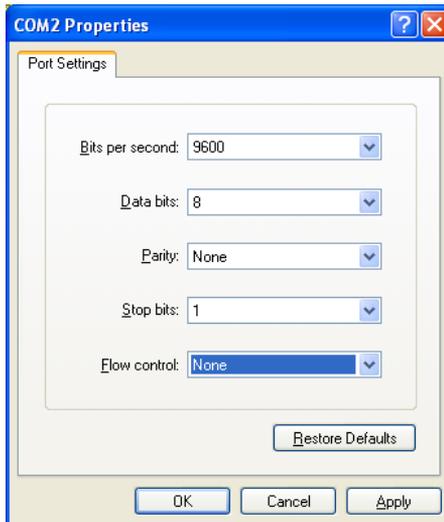
5) Type **CONFIG PASS**<Enter>" and capitalize all letters
6) Follow the instructions on screen to Set Baud Rate, Data Bits, Stop Bits, and other parameters. The parameters for the gage can be found in the gage's operating manual.  If a Request Command is required, enter that information as well. Finally, enable the pass thru port.

    For example (from page 21):
- 3<Enter>
- N<Enter> ///Must Be Capitalized
- 8<Enter>
- 1<Enter>
- 01<Enter>
- 08<Enter>
- N<Enter> ///Must Be Capitalized
- N<Enter> ///Must Be Capitalized
- Y<Enter> ///Must Be Capitalized

7) After saving the parameters reset the GageMux® and connect the RS-232 end of the gage into the Pass-Thru Port of the GageMux®.

The following is an example of RS232 gage pass-thru set up for the GageMux USB:

```
CONFIG PASS
Select Baud Rate:
0 - 1200
1 - 2400
2 - 4800
3 - 9600
4 - 19200
5 - 38400
3
Select Parity (N,O,E):

N
Select Data Bits (5,6,7,8):
8
Select Stop Bits (1,2):
1
Enter starting position of the reading(##):
01
Enter Length of Gage reading - Max 8 characters(##):
08
Request Command(Y/N):
N
Enable Pass Thru Port(Y/N):
N
Settings Configured To:
Pass Thru Settings:
Baud Rate:9600
Parity (N,O,E):N
Data Bits (5,6,7,8):8
Stop Bits (1,2):1
starting position of the reading(##):01
Length of Gage reading - Max 8 characters(##):08
Request Command:
Enable Pass Thru Port:N
Save Settings (Y/N):
Y
Settings Saved!
```

**Flow Mode**

The GageMux® USB can also be operated in flow mode to continuously send data to the computer. When in this mode, all ports are continuously scanned and readings from active ports are sent in full comma-delimited format. The flow mode is triggered by pressing the foot switch in Channel#1 or requesting data using host commands. If multiple units are connected in daisy chain, set the first unit to flow mode and all the backplane units to global footswitch mode.

## Rotary Switch Settings

The tables on the next few pages provide the correct rotary switch settings for all modes of operation.

To access the internal rotary switch banks, follow these instructions:

1. Remove the rear cover. Use a Philips screwdriver to unscrew the two screws located on the rear of the enclosure. Pull off the rear faceplate and bezel.

2. Remove the top cover. Gently slide the top of the enclosure toward the rear to expose the inside of the GageMux® USB.

The Rotary switches are labeled SW1, SW2, and SW3. The location of the switches is shown below.
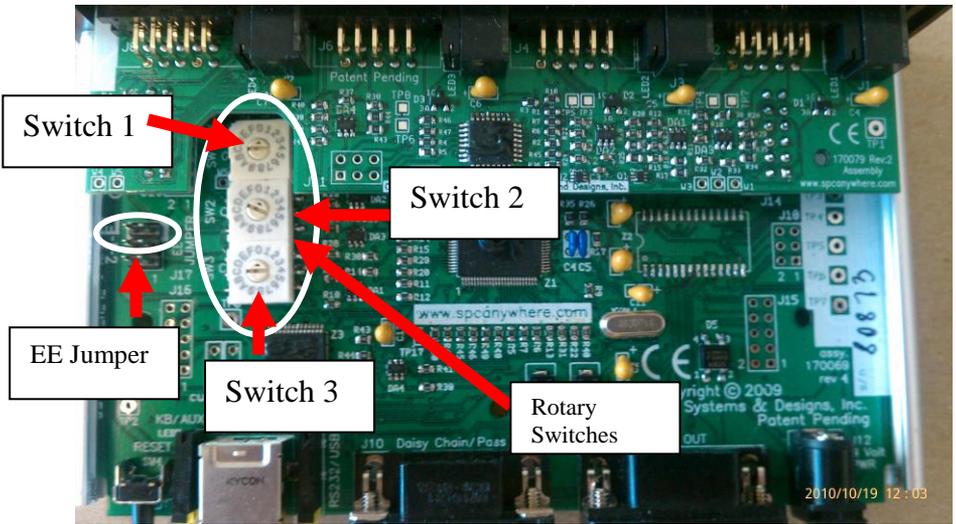


## Rotary Switch Locations

*The Factory default settings are for normal foot switch mode, full output string, 9600 baud, all gages in normal mode, and channel numbers set to 1, 2, 3, and 4. GageMux® with optional keyboard output are set to perform a carriage return after the reading in triggered.*

**Rotary Switch # 1 (SW1)**

- **To switch between USB, RS-232, and keyboard output**

| ROTARY SW1 | | |
|---|---|---|
| Description | Switch Position |  |
| USB OUTPUT | 0 | 9600 Baud |
| RS-232 OUTPUT | 4 | 9600 Baud |
| KEYBOARD OUTPUT MODE | 8 | +0.0000 <CR> |
| KEYBOARD OUTPUT MODE | 9 | +0.0000<TAB> |
| KEYBOARD OUTPUT MODE | A | +0.0000<TAB> 01<CR> |
| KEYBOARD OUTPUT MODE | B | Gage 1 <TAB> Gage 2　<CR> |
| KEYBOARD OUTPUT MODE | C | <TAB> after the first two gages, then <CR> after gage 3 reading |
| KEYBOARD OUTPUT MODE | D | <TAB> after the first three gages, then <CR> after gage 4 reading |
| Additional Settings for 8-port GageMux® with Keyboard Output | | |
| KEYBOARD OUTPUT MODE | 5 | <TAB> after the first four gages, then <CR> after gage 5 reading |
| KEYBOARD OUTPUT MODE | 6 | <TAB> after the first five gages, then <CR> after gage 6 reading |
| KEYBOARD OUTPUT MODE | 7 | <TAB> after the first six gages, then <CR> after gage 7 reading |
| KEYBOARD OUTPUT MODE | F | <TAB> after the first seven gages, then <CR> after gage 8 reading |
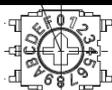
**Rotary Switch 2 (SW2)**

- **Settings for Flow Mode, Foot Switch, Output String Formats, and Baud Rate**

| ROTARY SW2 | | |
|---|---|---|
| Description | Switch Position | |
| Flow mode, Full comma delimited format, 9600 baud | 0 | |
| Normal foot switch mode, Full comma delimited format, 9600 Baud | 1 | |
| Normal foot switch mode, Reading only format, 9600 Baud | 2 | |
| Normal foot switch mode, Mitutoyo Mux-10 format, 9600 Baud | 3 | |
| N/A | 4 | |
| Global foot switch mode, Full comma delimited format, 9600 Baud | 5 | |
| Global foot switch mode, Reading only format, 9600 Baud | 6 | |
| Global foot switch mode, Mitutoyo Mux-10 format, 9600 Baud | 7 | |
| Single trigger foot switch mode, Full comma delimited format, 9600 Baud | 8 | |
| Single trigger foot switch mode, Reading only format, 9600 Baud | 9 | |
| Single trigger foot switch mode, Mitutoyo Mux-10 format, 9600 Baud | A | |
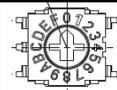
**\*\*NOTE: Global Footswitch can be triggered with a foot switch plugged into any footswitch port or host port command.**

**Rotary Switch 3 (SW3)**

- **MAX/MIN/TIR Mode**

| ROTARY SW3 | | |
|---|---|---|
| Description | Switch Position |  |
| N/A | 0 | |
| Port 1 MAX/MIN/TIR | 1 | |
| Port 1, Port2 MAX/MIN/TIR | 2 | |
| Port 1, Port2, Port3 MAX/MIN/TIR | 3 | |
| Port1, Port2, Port3, Port 4 MAX/MIN/TIR | 4 | |
| Port1, Port2, Port3, Port 4, Port5 MAX/MIN/TIR | 5 | |
| Port1, Port2, Port3, Port 4, Port5, Port6 MAX/MIN/TIR | 6 | |
| Port1, Port2, Port3, Port 4, Port5, Port6, Port7 MAX/MIN/TIR | 7 | |
| Port1, Port2, Port3, Port 4, Port5, Port6, Port7, Port8  MAX/MIN/TIR | 8 | |
| Port 2 MAX/MIN/TIR | 9 | |
| Port 3 MAX/MIN/TIR | A | |
| Port 4 MAX/MIN/TIR | B | |
| Port 5 MAX/MIN/TIR | C | |
| Port 6 MAX/MIN/TIR | D | |
| Port 7 MAX/MIN/TIR | E | |
| Port 8 MAX/MIN/TIR | F | |
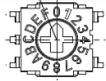
## E-Commands – See Table on Page 28

The jumper must be set in order to use E-commands. To use E-commands the jumper must be placed on pins J5/6 and The GageMux® reset using the reset button. To return to the rotary switch mode settings, hang the jumper from pin J5 only and hit the reset.

The structure of the E-Command is        **EXXXX<CR><LF>**

XXXX is the mode setting value and can be found in the E-Commands Table on the following page.

*Example One:*            *E1010<CR>*

- This command would configure the unit with the mode 1010. According to the table this mode is: **Normal Footswitch mode, 9600 baud and USB output**.

*Example Two:*            *E5010<CR>*

- This command would configure the unit with the mode 5010. According to the table this mode is: **Global footswitch mode, USB output with 9600 baud.**

*Example Three:*            *E5031<CR>*

- This command would configure the unit with the mode 5031. According to the table this mode is: Global footswitch mode, RS-232 output with 38400 baud.

After sending this command, the unit sends

*"OK, Mode set to 1010, Please Reset the Unit"*
*"You would like to Reset Now? (Y/N)"*

You need to reset the unit in order for the mode changes to take place. If you send "Y" the unit would reset on its own, or you can send "N" to reset the unit later.

**E-Command Table**

**\*\* NOTE: Settings will be saved in unit internal eprom/memory until changed or EE Jumper removed**

The structure of the command is **EXXXX\<CR>\<LF> w**here XXXX is the mode setting value

**E00XY**: Flow Mode.
**E10XY**: Normal Foot Switch Mode, Full Comma Delimited.
**E11XY**: Min/Max/TIR (PORT 1)
**E12XY**: Min/Max/TIR (PORTS 1, 2)
**E13XY**: Min/Max/TIR (PORTS 1, 2, 3)
**E14XY**: Min/Max/TIR (PORTS 1, 2, 3, 4)
**E15XY**: Min/Max/TIR (PORT 1, 2, 3, 4, 5)
**E16XY**: Min/Max/TIR (PORTS 1, 2, 3, 4, 5, 6)
**E17XY**: Min/Max/TIR (PORTS 1, 2, 3, 4, 5, 6, 7)
**E18XY**: Min/Max/TIR (PORTS 1, 2, 3, 4, 5, 6, 7, 8)
**E20XY**: Normal Foot Switch Mode, Reading Only.
**E30XY**: Normal Foot Switch Mode, Mitutoyo Mux-10.
**E40XY**: N/A
**E50XY**: Global Foot Switch Mode, Full Comma Delimited.
**E60XY**: Global Foot Switch Mode, Reading Only.
**E70XY**: Global Foot Switch Mode, Mitutoyo Mux-10.

| **X**: Baud Rate | **Y**: Data Output |
|---|---|
| 0: 4800 | 0: USB |
| 1: 9600 | 1: RS-232 |
| 2: 19200 | 2: Keyboard mode - 1 |
| 3: 38400 | 3: Keyboard mode - 2 |
| | 4: Keyboard mode – 3 |
| | 5: Keyboard mode – 4 |
| | 6: Keyboard mode – 5 |
| | 7: Keyboard mode – 6 |

**To set up Daisy Chain Using E-Command Mode**

Using the first GageMux®, add the prefix GMxx to EXXXX from the
example above. The xx in GMxx stands for the specific GageMux®
number  in the daisy chain.

EXXXX is the mode setting value and can be found in the E-Commands
Table on the following page.

> *Example:*                    *GM01E1010<CR>*

- This command would configure the GageMux® #1 with the mode
  1010. According to the table this mode is: **Normal Footswitch
  mode, 9600 baud and USB output**.

To set up three GageMux® daisy chained together, send the following
commands

> *Example:*          *GM01E1010<CR>*
> *GM02E1010<CR>*
> *GM03E1010<CR>*

- This command would configure the GageMux® #1, 2 & 3 with
  the mode 1010. According to the table this mode is: **Normal
  Footswitch mode, 9600 baud and USB output**.

**Host Commands**

The GageMux® USB interface will accept various commands from the host computer to change channel setups or request data from gages. Note that any change to an input channel's mode using host commands takes effect immediately, and is active until the mode is changed from the host, the reset button is pressed (modes are always reset to rotary switch settings), or power is removed. The following is a list of the commands and their formats.

| Command | Description | Example |
|---------|-------------|---------|
| RCC<CR> | Read data from a channel. CC is the channel number (01 through 99) and <CR> is a carriage return (Enter). | R01<CR> Requests data from channel #1 |
| SCCM<CR> **NOTE: temporary command and setting will be lost when unit is reset | Change the setup of a channel. CC is the channel number (01 through 99). M is the mode (0 for Normal mode, 1 for MIN/MAX/TIR mode). <CR> is a carriage return (Enter). | S011<CR> Changes the mode of channel 1 to MIN/MAX/TIR. |
| OM<CR> **NOTE: temporary command and setting will be lost when unit is reset | Change the output string mode. M is the mode (0 for full comma delimited output string mode, 1 for reading only mode, 2 for Mitutoyo Mux-10 mode). <CR> is a carriage return (Enter). | O0<CR> Changes the output mode to full comma delimited. |
| FM<CR> **NOTE: temporary command and setting will be lost when unit is reset | Change the foot switch mode. M is the mode (0 for normal foot switch mode, 1 for global foot switch mode).2 for continuous mode. <CR> is a carriage return (Enter). | F1<CR> Changes the foot switch mode to global. |

| Command | Description | Example |
|---|---|---|
| XX1<br>Or<br>RESET | Reset the GageMux® USB as if the reset button were pressed. | XX1<br>Reset the GageMux® USB. |
| RSS<CR> | Returns the current Rotary Switch settings. | RSS<CR> |
| GMUUE<CR> | Returns the current E-Command Mode setting. UU: Unit number (ex: 01,02,03….) | GM01E<CR><br>GM02E<CR><br>GM03E<CR> |
| TABLE<CR><br>OR<br>HELP<CR> | Returns the possible mode settings table for E-commands | TABLE<CR><br>HELP<CR> |
| GMUUEXXXX<CR><LF> | Sets the mode for E-Commands. (Look at E-Command section for more information) | GM01E1011<CR> |
| XX2<CR> | Reset all Backplane units | XX2<CR> |
| CONFIG PASS<CR> | Configure Settings for Pass Thru Port (only valid PASS THRU PORT is enabled) | CONFIG PASS <CR> |
| RCCF<CR> | Read data from a channel. CC is the channel number (01 to 99) The letter "F" designates the Armed mode slaving to footswitch #1. And <CR> is a carriage return (Enter). | R03F<CR><br>Disables operation on channels 1, 2 and 4. Arms channel 3, requests data from channel 3 when channel 1's footswitch is closed. |

## Introduction to FlashCable®

The Advanced Systems & Designs FlashCable® is a device engineered to produce an output in Mitutoyo Digimatic format. The Advanced Systems & Designs FlashCable® is designed to work with Advanced Systems & Designs GageMux® USB or any other similar devices. The FlashCable® can receive data in several formats, such as the RS-232 signal, USB signal, and convert it to the standard Mitutoyo Digimatic format.

The FlashCable® gage interface output can be directly connected to the GageMux® USB. When the FlashCable® is connected to the GageMux® USB, the LED on the FlashCable® turns GREEN, this indicates that the FlashCable® is connected properly and the LED briefly turns RED when the data is being sent or a data request is triggered.

The data transfer can be triggered using any of the following methods:

1) Using the data send button on the device or on the cable connecting the gage and the FlashCable®.
2) Using a Footswitch on the FlashCable®.
3) Using the Footswitch port on the GageMux® USB (or equivalent triggering method)

The FlashCable® does not obtain any power from the gage. When connected to the GageMux® USB, the pin 9 of the 10-pin input port provides the power to the FlashCable®.

When the FlashCable® is shipped, the FlashCable® description, calibration date, model number and serial number are stored in the EEPROM of the FlashCable®. These are the factory settings; please do not change them. The FlashCable® is configured with the default communication parameters of the gage or RS232 device. These communication parameters are seen on the configuration sheet provided with the FlashCable®. For a FlashCable® using the RS-232 signals, the communication parameters can be re-configured using the GageMux® USB FlashCable® utility.

Follow the instructions in this guide to:

- Install and configure the FlashCable® to communicate with the desired RS-232 Device

- Connect the FlashCable® interface to a device

- Enter gage related information onto the memory of the FlashCable®

*NOTE—In order to configure the Advanced Systems & Designs FlashCable®, a  GageMux® USB (2, 4 or 8 port) with firmware version 3.0 or later must be used along with the FlashCable® configuration program.*

### *Reading RS-232 multiple fields*

When the FlashCable® is interfaced with an RS-232 device, the fields must be defined. The fields are defined as:

- Numerical values:  (0-9) 1 23 456 7890
- Decimal Point: Each decimal point or each decimal point pair counts as a numerical field .
- Positive and Negative signs combinations such as ++,--, +-,-+
- Space between the two valid fields (example .1 2)

Examples of the fourth field:

<u>RS-232 String:</u>          <u>The Fourth Field would be:</u>

1 2 3 4                      4 (each number is separated by a space)

1 2 3 - 4                    -4 (Note: the sign needs to be within 36 characters of the number)

++ 1 2 3 4                   3 (the consecutive ++ counts as a numeric field)

ABC 1 2 3 5                  5 would be the fourth field since ABC is not a valid field

ABC-.1DEF2GHI3ZXC9       9 is the fourth field the letters only act as separators

1234 + 34.66 - 134.22 55     55 would be the fourth field

Feel free to contact

Advanced Systems & Designs / Greystone Industries LLC
support@spcanywhere.com

Or call
248-370-9919
for technical assistance

### FlashCable® Programming

FlashCables can be programmed with the flash utility (v2.0 and higher) to either parse a single field of data from an RS232 gage or parse multiple fields. Instructions to do this are explained below in "Changing RS232 Parameters for Single Field Parsing" and "Changing RS232 Parameters for Multi Field Parsing" respectively.

### Program FlashCable®:

Use the following steps to set up the FlashCable® gage interface. Steps 1 –13 are used for all Advanced Systems & Designs FlashCables®. Steps 1-21 are used for universal RS-232 FlashCable® gage interfaces.

1. Connect the FlashCable® to one of the Port on GageMux USB.
2. Power up the GageMux and connect the USB cable.
3. Open the Program FlashCable.exe
4. When you the open the program, the program will open a dialog box saying "Would you like to Scan All Ports?" Click Yes and wait until all the Ports and Done Scanning. During Scanning the "Scan Ports" button is disabled, wait until the button is active again.
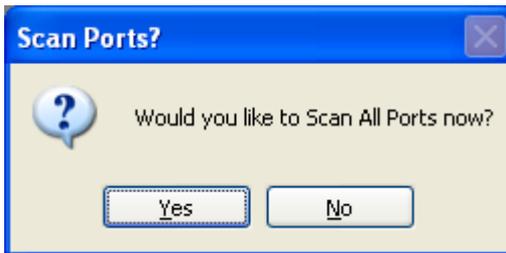
5.  Below is an image of how the screen will look like after scanning for the GageMux® USB.
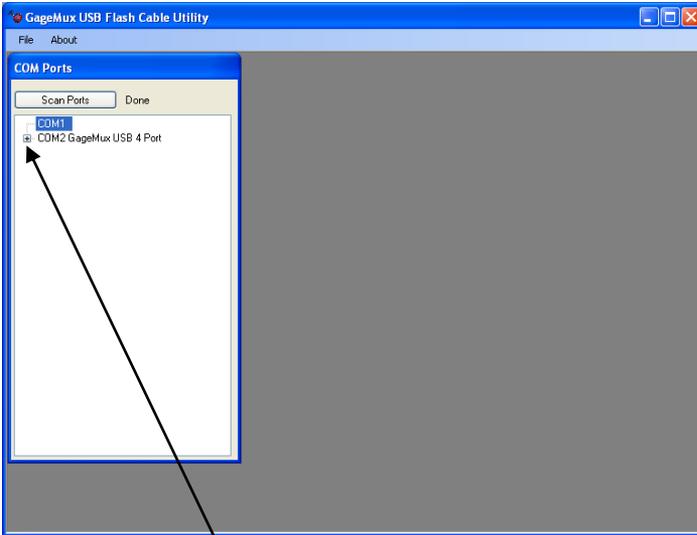


6.  Click the "+" sign to populate the ports.
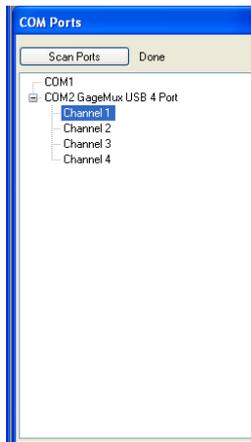
7.  Right click on the channel the FlashCable® is connected and
    Click on "Program Flash Cable".
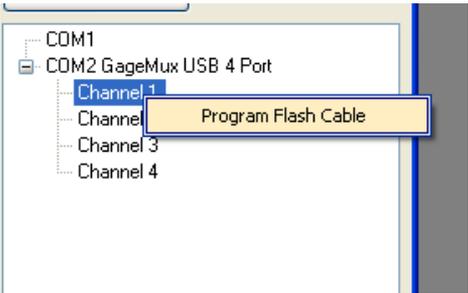


8.  After few seconds the following Flash Cable Programming dialog
    box will open.
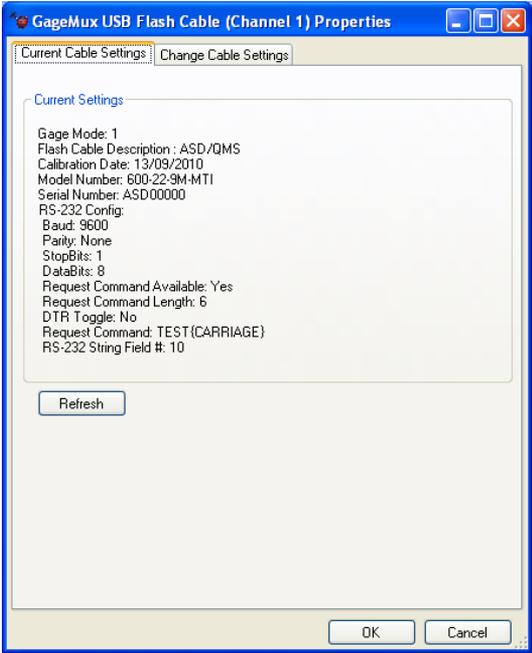
This current version only has one *Gage Mode* which is just a normal data in/data out.

***Flash Cable Description:***  Can be anything to be described.  For example for the description for this FlashCable® is the company name.

***Calibration Date:***  Again this can be used to enter the date of the gage's last date.  The factory default will be the date of programming at Advanced Systems & Designs.

***Model Number:*** Can be the device that this FlashCable® is connected to. The factory default in this field will be Advanced Systems & Designs model number of the FlashCable®.

***Serial Number:*** Can be the serial number of the gage to help track down any inconstancy measurement, i.e. if the gage is working or not.  The factory default will be the Advanced Systems & Designs FlashCable® serial number.

The above are used for all FlashCable® gage interfaces.  The RS-232 configuration is for the universal RS-232 to Mitutoyo FlashCables.  These will be explained later in this document.

9.    Click on the Change Cable Settings TAB.
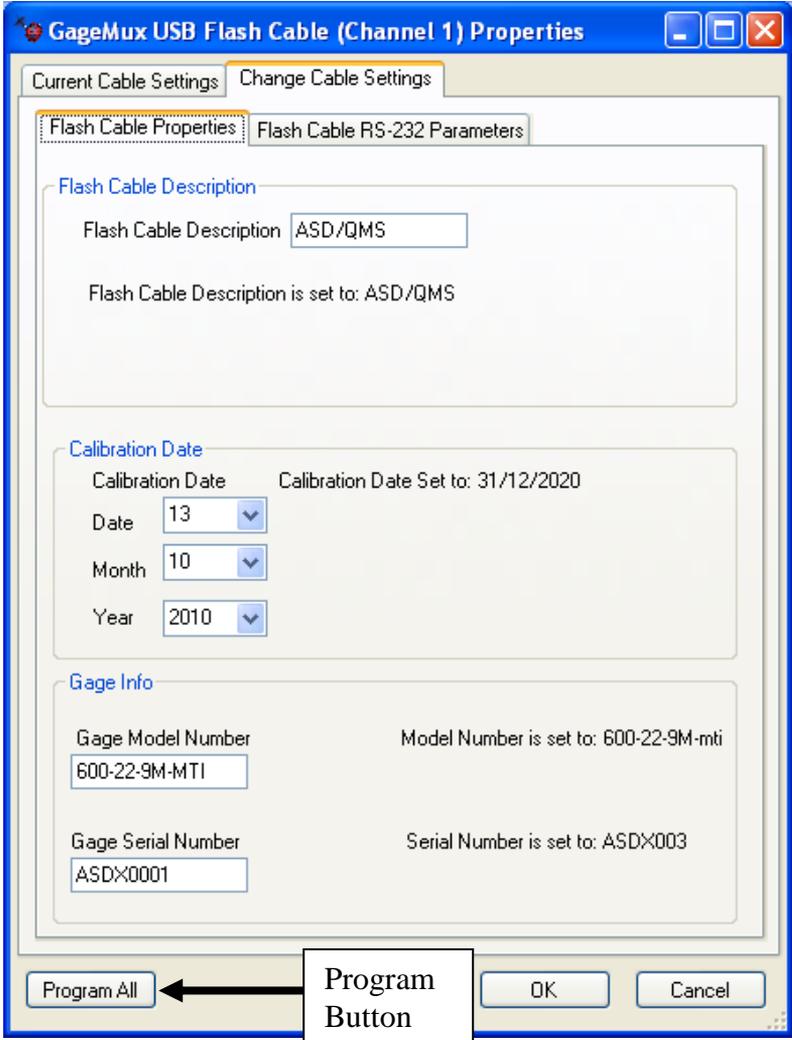


10.  Change FlashCable® description to appropriate description and
     click the Program All button.  Anything changed will be updated
     when programmed.
11.  If the "Programmed Successfully" message box shows up, the
     FlashCable® is programmed successfully with the requested field.

Flash Cable Description Programmed Successfully

OK
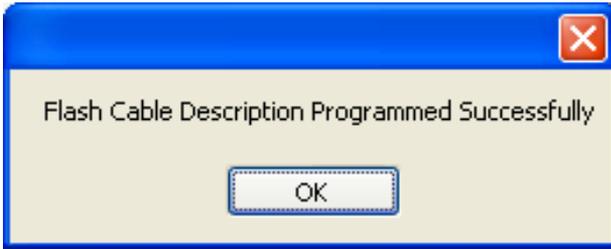
12. Similarly "Gage Model Number" and "Gage Serial Number" will have a similar response.
13. With the Calibration Date, ensure that the selection be from the dropdown menu otherwise an "Enter a Date" message box will appear.



Choose a Date!

OK

## CHANGING RS-232 PARAMETERS FOR SINGLE FIELD PARSING

14. To change RS-232 parameters, first obtain the RS-232 parameters of the device.
15. Once you have the information of the gage RS-232 Parameters, click on "FlashCable RS-232 Parameters" TAB.
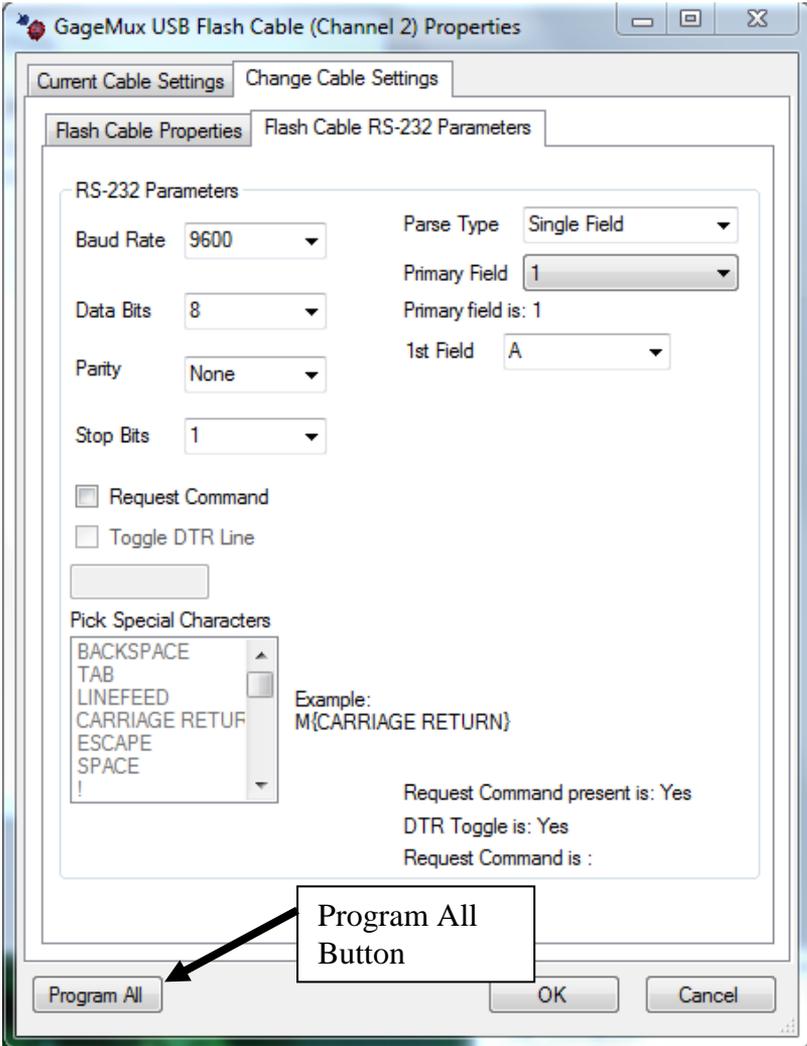
16. Choose Baud Rate, Data Bits, Parity, Stop Bits, by choosing the appropriate setting from the drop down.

*Baud Rate* - is the speed which the FlashCable® will communicate.  The valid range is 1200, 2400, 4800, 9600, 19200, 38400

*Data Bit-* is the number of bits within the RS-232 frame that contain the ASCII data.  Either 7 or 8 bits are valid

*Parity-* is used when dealing with RS-232 communications error.

***Odd*** - Odd Parity will be if the sum of Data bits and Parity bits must be ODD

***Even*** - Even Parity will be if the sum of Data bits and Parity bits must be Even

***None*** – No Parity bit will be used.

***Stop Bits -*** are the number of bits used to end an RS-232 frame. Valid Stop Bits are 1 or 2.

17. First select 'Single Field' under the 'Parse Type' drop down menu since we will only be parsing a single field from the gage. Primary Field is the field number from the reading you would like to parse. You can parse reading with up to 4 different readings.

    ***Example:*** *Reading "01, 56.123, NRM, 01" has two fields with numbers in it – 01 and 56.123, 01 is field 1 and 56.123 is field 2. If you would like to parse field 2, you have to choose 2 from the "Primary Field" drop down.*

    Select 'A' in the '1st Field' drop down menu.

18. If there is no request command, leave the Request Command check box unchecked and click on Program and wait for the "OK" message.
19. If there is a request command, check the Request Command check box.
    - You can either request command by sending a request string (ex: R01<CR>) or by toggling the DTR Line. – Refer to the Gage Manual to obtain information on whether the setting you need to use.
20. If the reading is requested by toggling DTR line, check the checkbox for "Toggle DTR Line".  This option is used for Fowler/Sylvac OPTO gages.
21.  If the reading is requested by sending a request command like R01<CR>, type R01 in the textbox and from the special characters list, double click on "CARRIAGE RETURN".
22. If any changes are made to the RS-232 Parameters, the FlashCable® must reset itself in order to utilize the new RS-232 parameters.

Your Gagemux must Reset

OK

The GageMux has successfully Resetted

OK
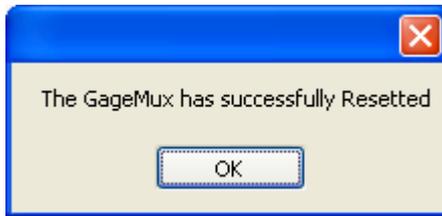
23. After programming the FlashCable®, the program will indicate what changes were made.

Programming Complete On:
Flash Cable Description
Flash Cable Date
Flash Cable Model
Flash Cable Serial Number
Flash Cable RS-232 Parameters

OK

24. Programming can also be done through the OK button (see page 43).

OK
Button
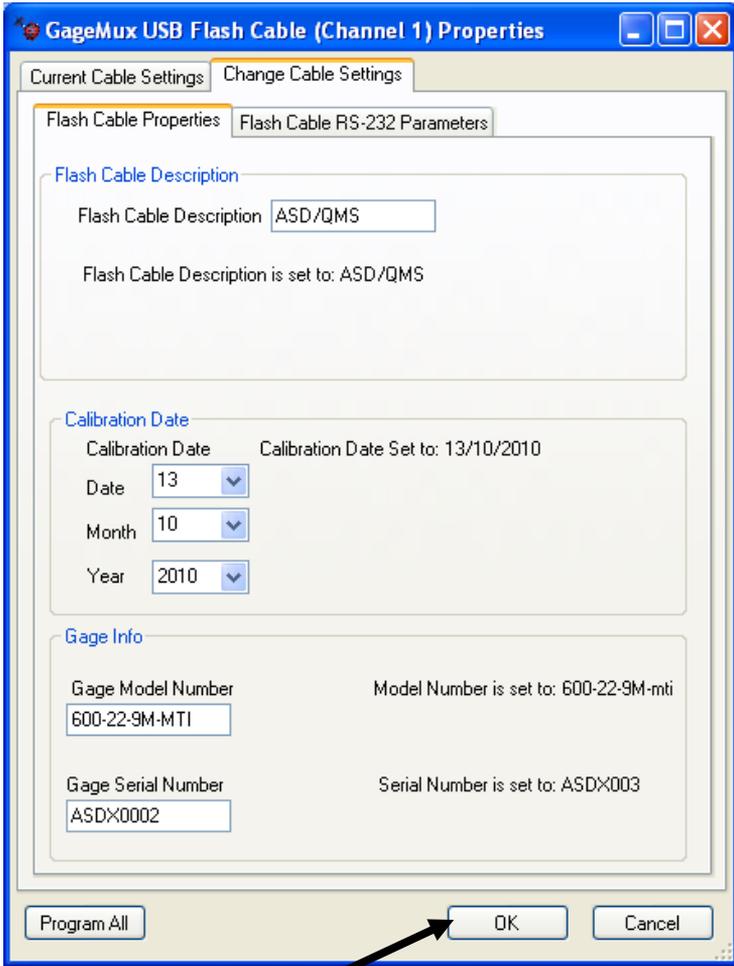
25. Simply click OK and the following message will indicate that there are non-programmed settings.

The user will then be prompted with a query to program all parameters.



26. If "No", the FlashCable® will return to the previous state. If "Yes", any unchanged parameters will be updated and then the program will exit Flash Cable Properties.
27. Clicking on the Cancel button will discard any non-programmed parameters.
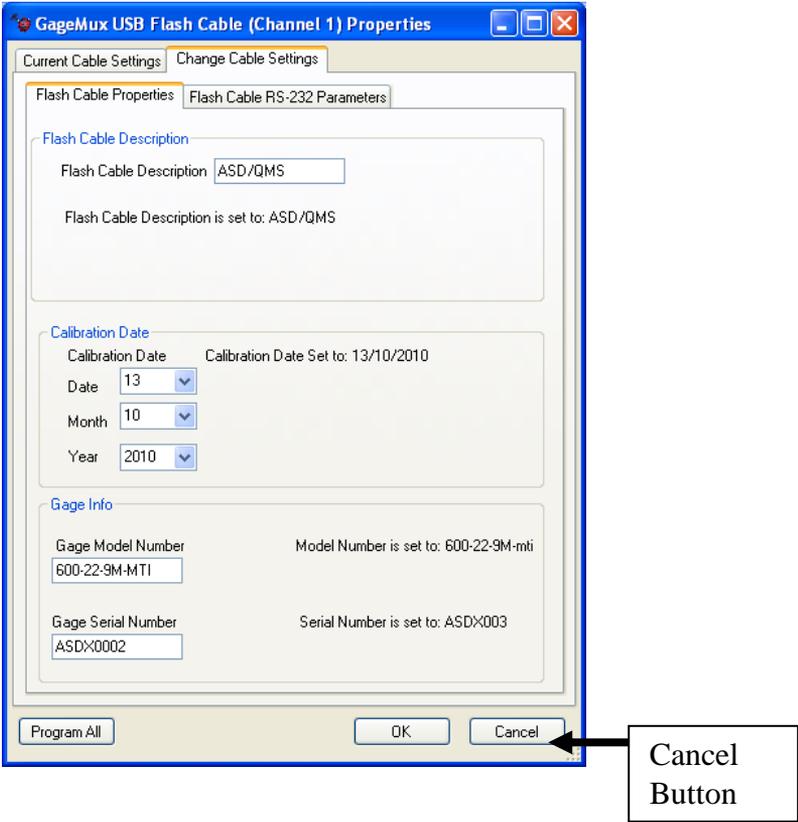
## CHANGING RS-232 PARAMETERS FOR MULTIPLE FIELD PARSING

Some FlashCable® gage interfaces can be programmed to accept and parse multiple fields of data from custom RS232 gages that are configured to output multiple fields. An example of this would be a device that reads measurements from X, Y, and Z axes.
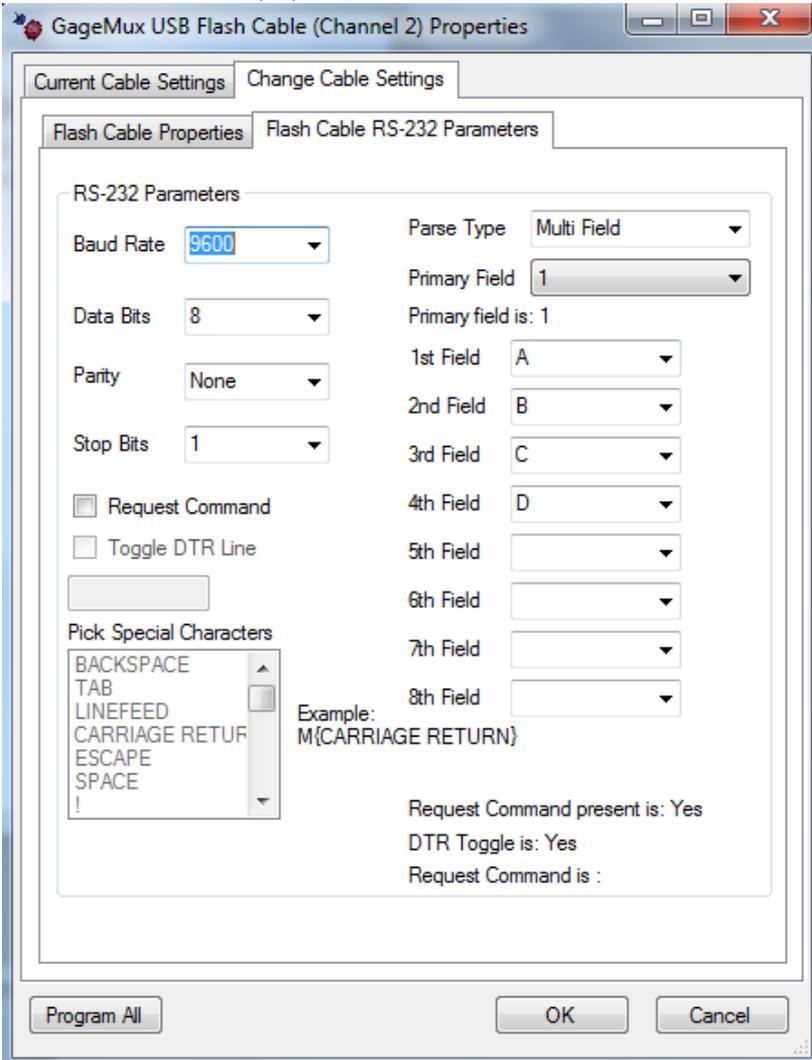
1. Follow the instructions as they are explained for single field parsing to change to the desired requirements in the 'Flash Cable Properties' tab.

2. Once you have the information of the gage RS-232 Parameters, click on "Flash Cable RS-232 Parameters" TAB.

3. Configure **Baud Rate, Data Bits, Parity, Stop Bits** and the **Request Command** as per the gage settings and as explained above in 'Changing RS232 parameters for single field parsing.

4. Select '**Multi Field'** in the 'Parse Type' drop down menu. Primary Field is the field number from the reading you would like to parse. This is the field that will be parsed from each channel of gage data. For example, a gage that outputs 3 strings of data like this.

> CH#1,  +234567,  ABC,  NRM1
> CH#2,  -6758345,  DEF,  NRM2
> CH#3,  +6759430. GHI,  NRM3

If '2' is selected for Primary field, the FlashCable® will read and store the numerical value of each line.

5. Set the $1^{st}$ field to the $8^{th}$ field with their corresponding letters in their respective drop down menus depending on the number of channels/lines the gage is set to output minus 1. For example a gage is configured to output 4 lines or channels of data The user will select '**A**' next to '**$1^{st}$ Field'** '**B**' next to '**$2^{nd}$ Field**' and '**C**' next to '**$3^{rd}$ Field'**.

6. Click the 'Program All' button to save the configuration settings for the FlashCable®. After programming, dialog boxes will appear to indicate what changes were made. Simply click 'OK' on these dialog boxes.

## Other Functionality of the Flash Cable Program

In the "File" tab, there are "*Scan*", "*Terminal*", "*Properties*", "*Flash Cable Properties*" and "*Exit*".
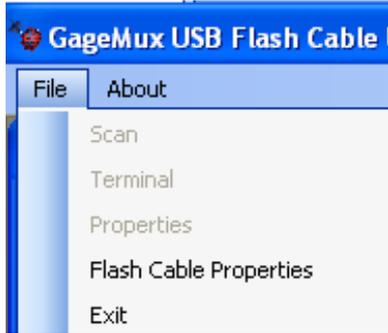
"*Scan*" offers the same functionality as "Scan Ports" and looks through the COM Ports for a GageMux® USB.

"*Terminal*" offers a Communication Terminal, set at 9600 Baud Rate, No Parity, 8 Data Bits, and 1 Stop bit, for communication between the computer and the GageMux® USB.  These parameters are NOT adjustable and the usage with this function is not supported on $3^{rd}$ party application/hardware.

## Warranty

The quality of this product is warranted for a period of 12 months from the date of purchase. This warranty covers all material and manufacturing defects. Advanced Systems & Designs / Greystone Industries LLC shall repair, or if deemed necessary, replace a defective unit free of charge for the duration of the warranty. An RMA form must accompany all repairs or returns. Please call **(248) 370-9919** to receive an RMA form or download the RMA form by visiting **http://www.spcanywhere.com/support-rma-form/**

## Tech Support

Our technical support staff is available to solve any problems related to this product. Please contact us by email **support@spcanywhere.com**, by phone **(248) 370-9919**, or by fax **(248) 370-9921.**

## Revision History

| Version | Date | Description |
|---------|------|-------------|
| 1.1 | August,2009 | Updated manual to match GageMux® USB 500-40/80 USB |
| 1.2 | Feb, 2010 | Updated to match Version 2.19 |
| 1.3 | March, 2010 | Added Keyboard output table to match Version 2.4 |
| 1.4 | November,2010 | Added Programmable FlashCable® support Version 3.0 |
| 1.5 | December 2014 | Updated for GageMux® USB firmware v3.14 |