



# Check-MATE, USB Programming Note

Programming Oi products is both simple and easy. Programmers can use Visual BASIC, C/C++, LabView, LabWindows, Vee or any language that allows access to through a serial port. To facilitate remote control for the Check-MATE, a USB interface is required. When connected to a host PC, the USB connection appears as a "Virtual Com Port", which establishes a serial data communications link between the PC and the Check-MATE. The default protocol is 19200 baud rate, no parity, 1 stop bit and no flow control. The Check-MATE is designed to respond to a unique set of ASCII serial data commands which are defined in the product User's Manual.

The flow chart on the right illustrates a basic programming sequence using the Check-MATE module. The Analog output is connected to the Analog input, Channel\_1. A pushbutton switch is connected to Digital Bit\_0, and each time the bit is asserted low, Analog Channel\_1 is measured. After the voltage is read, a 100mV value is added to the Analog output. The sequence starts by Initializing the Module (sending the CK\_MR command). Use HyperTerminal or some other terminal emulator program to send and verify the various commands in the sequence. Next issue the Module ID command (CK\_ID?). This is helpful to see which version of Check-MATE firmware is being used.

Next the Module is Configured by sending a series of commands. First is the CK\_SS04 command (which instructs the module to set all 8 analog inputs for Single-Ended operation, and select the ±10V range). Second is the CK\_MS100 command (which defines the number of voltage samples that are acquired and averaged). In this case 100 samples are specified. The next two commands (CK\_PD00000001 & CK\_PU00000001), set Digital I/O Bit\_0 (to the input direction and enable a weak pull-up respectively). Next command (CK\_DM0), sets the voltage output for bipolar operation (±10V range). Lastly, the CK\_SA2048 is used to set the voltage output to zero (because we are set for bipolar operation).

Now the program sequence enters a loop that involves testing Bit\_0 for an active-low state. Once the pushbutton switch is pressed, the program will exit the loop and issue the (CK\_AS1H) command. This will cause the Check-MATE to Scan all inputs channels (average 100 samples each), and return the results in Expanded mode (with a Hexadecimal data format). The final step adds 100mVolts to the current Analog Output value, by sending command (CK\_SAxxxx). The -xxxx- represents a value from '0000' to '4095'. The sequence then returns to the loop that checks the pushbutton switch.

A point of caution, the auto scan command (i.e., CK\_ASxx), was designed to maximize efficiency when acquiring analog measurements. Therefore it is very important to use the commands (i.e., CK\_SSxx or CK\_SDxxx) to configure the input channel parameters before hand.

