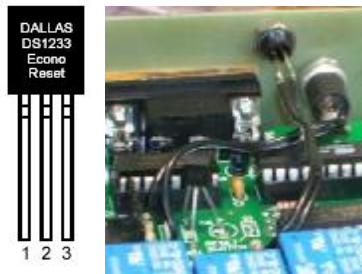


## CONVERSION TO A MULTI DROP I/O CONTROLLER

### **Converting a New I/O controller to Multi Drop I/O Controller**

These are the instructions for converting a new K108 kit that is being built into a multidrop I/O controller

Do not solder C6 (10uF), D6 (1N4148), R11 (10K) and reset switch S1 into the board.



Solder pin 1 of DS1233 into R11 closest to the MAX232

Solder pin 2 of DS1233 into R11 closest to the Relays

Solder pin 3 of DS1233 into + terminal of C6

Solder reset switch S1 into place where D6 used to sit

Noting the orientation of the IC put the AT90S2313 into IC1's socket

### **Converting Completed I/O controller to Multi Drop I/O Controller**

These are the instructions for converting an older K108 kit that has been built into a multidrop I/O controller

Remove C6 (10uF), D6 (1N4148), R11 (10K) and reset switch S1 from the board.

Solder pin 1 of DS1233 into R11 closest to the MAX232

Solder pin 2 of DS1233 into R11 closest to the Relays

Solder pin 3 of DS1233 into + terminal of C6

Solder reset switch S1 into place where D6 used to sit

Remove IC1(AT89C2051) and noting the orientation of the IC put the AT90S2313 in its place

## COMMANDS FOR THE MULTI DROP SERIAL I/O CONTROLLER

**The baud rate on your PC should be set at 9600 Baud, 8 Data Bits, No Parity, 1 Stop Bit**

Commands are presented in the form

@x CyyCR

where

x is the hexadecimal address of the controller. Valid addresses are 1 to 9 and A to F (10 to 15). If x is 0 then the controller will respond regardless of its actual address. **Note addresses A-F must be a capital letter**

C is the command consisting of a single letter. It can be a capitol or non capitol

yy is the parameter associated with that command

CR is a carriage return

Commands

**Ay - ADDRESS of Controller**

If y is a hexadecimal number between 1 and F it will set the controller to this address.  
The address will be saved to EEPROM. The default address is 1  
If y is a 0 then it will read the current address  
Eg @0 A0 reads the address of the controller  
@1 A2 set the address of controller 1 to address 2

**Cy – COUNT of pulses. This is a non resettable count**

Cy is the total number of pulses counted on input y. y has the value 1 to 4  
The response is a 3 hexadecimal byte number

**Py – COUNT of pulses. This is a resettable count**

Py is the number of pulses counted on input y. The internal count will be automatically reset. Y has the value 1 to 4  
The response is a 3 hexadecimal byte number

**Eyy – ECHO on/off**

E0 indicates no echo of characters received on the RS232 line  
E1 indicates echo of all characters received on the RS232 line back to the PC  
This setting is saved to EEPROM in the serial I/O controller. The default setting is off

**Dyy – Debounce**

This parameter is in hexadecimal format and is the degree of filtering placed on the counters. The number can be between 1 and FF. A value of 40hex is adequate for counting switches and relays. For higher and cleaner pulse rates a lower value can be used.  
This value is saved to EEPROM in the serial I/O controller

**Iy – INPUT status (where x = input number)**

A '1' is returned if the input is active or enabled, '0' otherwise.  
The command "I0" returns the status of ALL inputs. As with the 'S' command, a hex byte is returned. Bits 0-3 indicate the status of inputs 1-4. Bits 4-7 are unused and are set to '0'.  
Eg. "I1" – returns the status of input 1  
"I0" – returns the status of ALL inputs

**Fy – Turn a relay OFF (where x = relay number)**

Eg. "F3" – turn off relay 3  
"F0" – turn off ALL relays

**Ny – Turn a relay ON (where x = relay number)**

Eg. "N3" – turn on relay 3  
"N0" – turn on ALL relays

**Ty – TOGGLE a relay on/off (where x = relay number)**

Changes the state of a relay (ON to OFF, OFF to ON)  
Eg. "T3" – toggle relay 3  
"T0" – toggle ALL relays

**Ryy – Set ALL relays directly**

“yy” is a hexadecimal byte. Each bit within the byte indicates whether the corresponding relay is operated or not. If the bit is ‘1’ then the relay is operated, if the bit is ‘0’ then the relay is released.

Eg. “R55” – relays 1,3,5,7 ON, all others OFF

“R0F” – relays 1-4 ON, all others OFF

**Sy – relay STATUS** (where x = relay number)

A ‘0’ (zero) is returned if the relay is released, ‘1’ if operated.

The command “S0” returns the status of ALL relays. In this case a hex byte is returned.

Each bit within the byte indicates the status of the corresponding relay.

Eg. “S3” – returns the status of relay 3

“S0” – returns the status of ALL relays

**Vy – Software Version**

If y is a 0 then it will read the read the software version

## **SETTING UP A MULTI DROP CONTROLLER**

A controller will have the default address of 1 and echo off. When setting up a controller with its address, echo and debounce settings then it should be the only controller connected to the PC. If you want to communicate with a controller and don't know its address you can use the address of 0 which is a wild card address. A controller will always respond to an address of 0.

So if you want to set the address of the controller to 2 you would send the command

@0 A2

Then if you wanted to set relay 1 on, you would send

@2 N1

or you could still use the wildcard address

@0 N1

If the counters are to be used set the debounce to a suitable value using the command

@2 D40

Finally if the controller is to be connected in a multi drop then Echo should be switched off by sending

@2 E0

The address, echo and debounce settings are automatically saved to eeprom automatically hence you do not have to set them each time you turn on power to the controller..

You can now connect the controller into the multi drop network with the other controllers