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## A Serial Relay Interface
## RS232Relay



**Figure 1 RS232Relay**

RS232Relay User Guide Version 3.02
January 20, 2022

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## 2. Introduction

Thank you for your purchase of the RS232Relay.  The following instructions will assist you in configuring and operating the product.

RS232Relay provides an easy-to-use interconnection between your Personal Computer (PC) and switched devices.  The relays used on RS232Relay can be connected to almost any load to perform "real-world" functions.

RS232Relay has the following features:

- 4 dry contact relay outputs, each with a Form C contact, that is, a normally open and a normally closed contact, each capable of handling 100 Volts DC at up to 1.25 Amperes, or 120 Volts AC at 0.5 Amperes.
- Capable of Momentary, Pulsed or steady-state operation of the relays
    - Momentary operation is useable from 1 second to 99 minutes
- On-board LED's to show the state of the relays.
- Interfaces directly to your PC via a spare RS232 serial port, or via any RS232 to USB converter
- Power input of 12 Volts AC or DC at 350 mA.  Optionally, power can be provided from a 5V USB power converter connected to J7 on the front panel.

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## 3. Installation

To complete this project, you will need to connect a 12 to 16 Volt (AC or DC) transformer to connector J1 (see Figure 2 for the location of J1).  The transformer needs to supply at least 350mA.  The polarity of the connection to J1 is not important.  J1 may be a 3 terminal connector and if so, the middle terminal is not used.  For Version D and later PCB's, power may optionally be provided through the USB connector J7 located on the front panel. **Do not power up at this time.**

Connect a standard serial cable (straight-through) between J2 and your PC. Review Table 1 for which pins are used.  **Note: the USB connector J7 on Version D and later PCB's is provided for optional powering ONLY.**



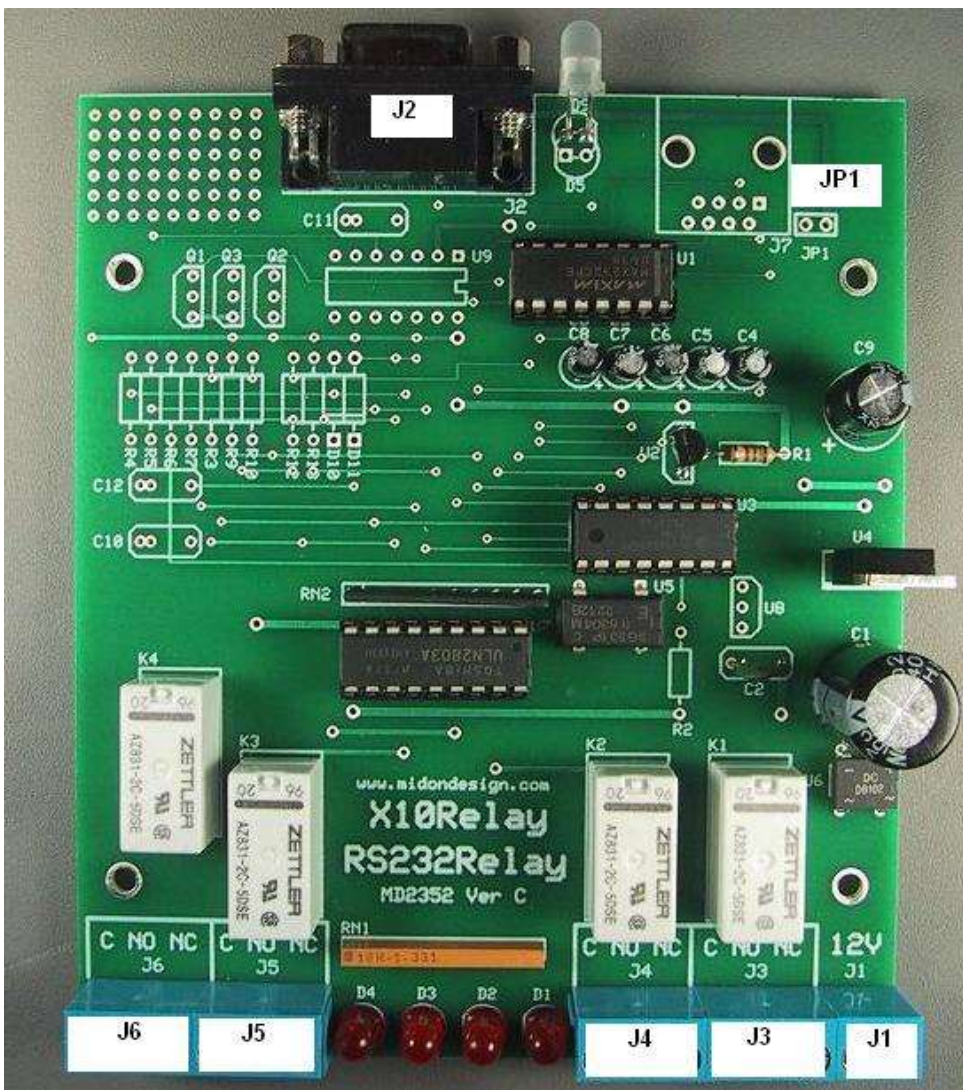**Figure 2 Location of Connectors (Version C PCB)**

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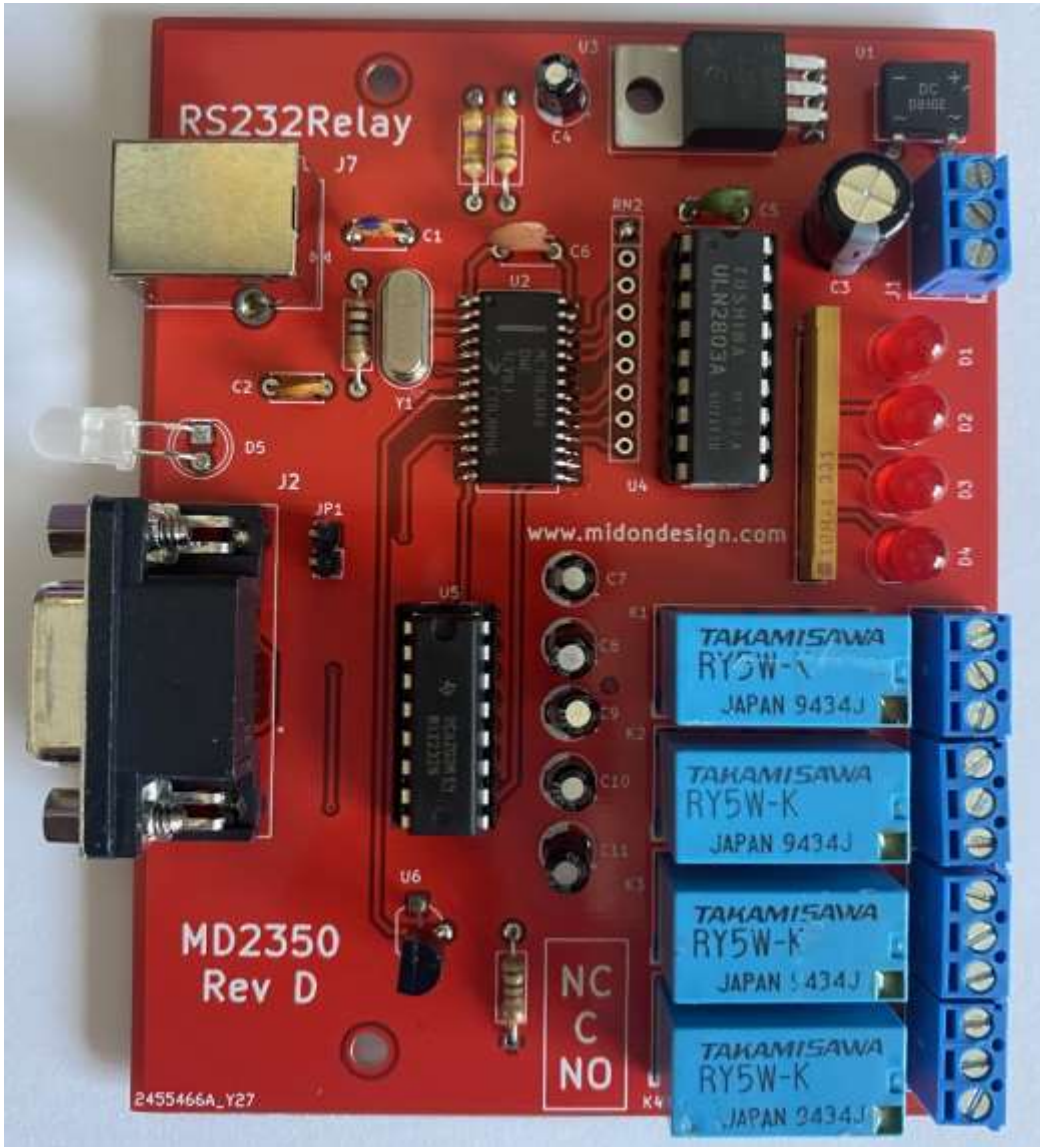


**Figure 3 Version D PCB**

**Table 1 RS232 Cable Connections**

| Pin Number | Pin Name | Definition |
|---|---|---|
| 1 | | Not used |
| 2 | TXD | Data from RS232Relay to your PC |
| 3 | RXD | Data from your PC to RS232Relay |
| 4 | | Not used |
| 5 | GND | Ground |
| 6 | | Not used |
| 7 | | Not used |
| 8 | | Not used |
| 9 | | Not used |

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**IMPORTANT:**

Due to a Version C PCB error, the labels for J3, 4, 5 and 6 are incorrect.  **NO** and **C** are swapped on the PCB labels.  Figure 3 shows how they should be connected (J6 shown, but applies to all relay terminals).  The **NC** contact is correct on all connectors.  **This does NOT apply to Version D or later PCB's and the sequence of the relay connections are as shown on the PCB.**



**Figure 4 Corrected Relay Contacts (Version C PCB ONLY)**

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## 4. Configuring RS232Relay

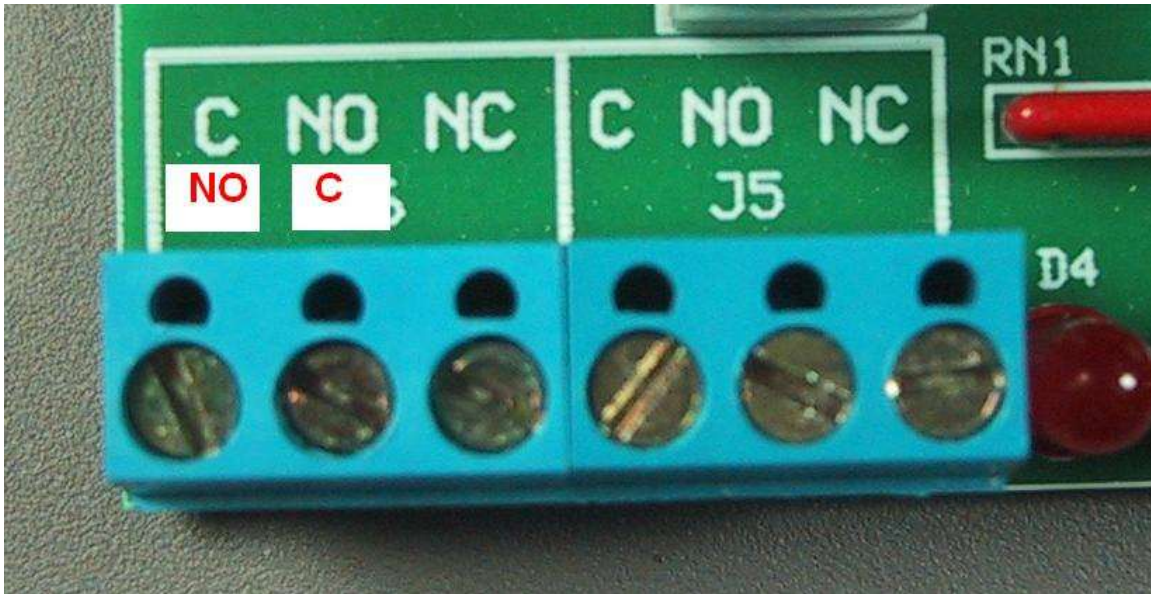Using Hyperterm, or any other terminal emulation program, configure the connected serial port to 9600 BPS, No parity, 8 bits, 1 start bit and NO hardware handshaking.  Ensure that the port chosen matches the connected serial port.

Now, apply power to RS232Relay.  The default start-up sequence will look like this:

```
RS232Relay v3.02 2022-01-17
www.MidonDesign.com
www.n0dim.com
Serial # 2632C0000001436ECB2D

Debug = Off
Momentary Relay Action = Off
Relay Powerup Restore = Off
Relay #01= Off
Relay #02= Off
Relay #03= Off
Relay #04= Off
Clones: None Set
```

The following commands will establish the parameters you need to control your relays.

### 4.1.      MOM

Use the **MOM** command to determine if you want your relays to turn off a pre-determined amount of time after turning on.  The **RLT** command sets that time interval, which can be anywhere from 1 second to 99 minutes.  Setting **MOM** on will enable the timer functionality.

Note that if the Momentary function is enabled, you will not be able to process any further commands to <u>any</u> of the relays until after the first command has gone through the time period established by the **RLT** command.  If you need to activate another relay in this period, use the **RTC** command to clear the timer and then proceed as normal.

### 4.2.      RLT

Set the time delay with the **Re**l**ay T**imer command.  Input any number from 0 to 99.  The time delay is measured in seconds (if TYP=S) or minutes (if TYP=M).

**RLT** is not a valid command if **MOM** is set to off.

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Using a time of 0 will cause a near-instantaneous relay off whenever you turn a relay on.

## 4.3.    TYP

Use the **TYP** command to determine the type of time interval desired by the **RLT** command.  The options are S for Seconds and M for Minutes.

**TYP** is not a valid command if **MOM** is set to off.

## 4.4.    SPR

Relay232 retains memory through a power failure, so if you want the relay states to revert to what they were prior to a power failure, enable this capability with the **S**et **P**ower **R**estore On command (**SPR** on).  This setting is defaulted to off.

## 4.5.    CLO

The **CLO**ne command provided for those cases when you may need more than a SPDT (Single Pole Single Throw) contact closure for an external device.  Cloning a relay makes two relays operate exactly as if they were one unit and thus gives you DPDT (Double Pole Double Throw) capabilities.

For example, if you want to use Relays 1 and 4 as a DPDT relay, use the command:

```
CLO1=4
```

Anytime you then set or clear relay 1, relay 4 will also set or clear.  The same is true in reverse; operating Relay 4 will also operate Relay 1.

*Cloning is only functional for 2 relays at a time.  If you attempt to clone 3 or 4 relays together, only the first 2 will activate together.*

RS232Relay ships with clones disabled.  If you want to clear any clones you have set, reset them all with the following command:

```
CLO0
```

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## 4.6.    DEB

Midon Design strives to ensure the highest quality of our software and hardware. However, there are times when problems do occur.  The **DEB**ug command is used to enable diagnostics so that Midon Design can trouble-shoot any problems you may encounter.  Normally the debug function is off, but if you have problems, set debug on and send us any outputs from RS232Relay.  This will speed up assisting you.  **DEB** parameters are On or Off.

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## 5. Using RS232Relay

Other useful commands are available to interact with RS232Relay.

### 5.1. RLx

You control the relays directly from your PC using the **RLx** commands.  The syntax is:

> RLx {on|off}

> Where x can be "A", "1", "2", "3" or "4"

**RLA** will turn on or off all the relays.

In Momentary mode, you cannot issue further **RLx** commands when a timer sequence is in process.  Use the **RTC** command to cancel the relay timer if you need to do additional operations on the relays.

### 5.2. RLS

The **Re**lay **S**tatus command will display the current relay states.

### 5.3. PLx

Use the **PLx** command to pulse any relay for approximately one second.  This can be used independently of the relay timer.  The syntax is:

```
PLx
```

> Where x can be "1", "2", "3" or "4"

The **PLx** command will return the selected relay to the state that it was in before the command.

### 5.4. DIS

The **DIS** commands displays your system status, including all settings and the current state of the relays.

The output will look something like this with MOM off:

```
RS232Relay v1.04 2009-09-01
```

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```
www.MidonDesign.com
www.n0dim.com
Serial # 2632C0000001436ECB2D

Debug = Off
Momentary Relay Action = Off
Relay Powerup Restore = Off
Relay #01= Off
Relay #02= Off
Relay #03= Off
Relay #04= Off
Clones: None Set
```

With momentary mode set to on, the output will look like this:

```
RS232Relay v1.04 2009-09-01
www.MidonDesign.com
www.n0dim.com
Serial # 2632C0000001436ECB2D

Debug = Off
Momentary Relay Action = On
Relay Timer = 01 Seconds
Relay Powerup Restore = Off
Relay #01= Off
Relay #02= Off
Relay #03= Off
Relay #04= Off
Clones: None Set
```

## 5.5.	RLT

The **R**e**L**ay **T**imer command sets the amount of time until a relay is de-activated after a RLxOn command has been issued.  This parameter is only in use when **MOM**entary mode is On.  The TYP command determines if the time will be measured in minutes or seconds.

## 5.6.	TYP

The **TYP**e command is used to set the parameter for the relay timer.  Valid inputs are "S" for seconds or "M" for minutes.

## 5.7.	RTC

The **R**elay **T**imer **C**ancel command will stop the timer when Momentary operation is active.  This may be useful if you need to change a relay when one has already been set in momentary mode.  This command is not valid if Momentary mode is not enabled.

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## 5.8.	HLP

The **HLP** command displays a simple list of all available commands, like this:

```
>hlp
CLO
DEB
DIS
HLP
MEM
MOM
PL1
PL2
PL3
PL4
RLA
RL1
RL2
RL3
RL4
RLS
RLT
RTC
SER
SPR
TYP
VER
ZZZ
```

## 5.9.	MEM

The **MEM**ory command is available if you want to inspect any of the memory in the RS232Relay program or data store.  It can also be used, under direction of our technicians, to modify data when trouble-shooting.  **USE THIS COMMAND WITH GREAT CAUTION.**

## 5.10.	VER

The **VER**sion command outputs the software version and serial number of RS232Relay.  A related command is **SER**, which will display just the serial number.

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## 5.11.    ZZZ

The **ZZZ** command will do a reset of RS232Relay, similar to power cycling the unit but without the need to remove power.  You should not normally need to use this command.

## 5.12.    Input Timeout

To avoid problems with erroneous characters, or noise on the serial input, there is an input timeout for any commands.  If more than 10 seconds elapse without a valid input after a command has been started, the operation will abort with the following error message:

```
? Input Timeout
```

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## 6. RS232Relay Command Summary

### Table 2 RS232Relay Command List

| Command | Description | Syntax |
|---------|-------------|--------|
| CLO | Clone a relay to another | CLOx=y<br>Where x = 1 to 4, y = 1 to 4 and the equal sign is provided by the unit |
| DEB | Enable or disable debug outputs. Use only when directed to by Midon Design | DEB<on\|off> |
| DIS | Display all settings of RS232Relay | DIS |
| HLP | Display a list of available commands | HLP |
| MEM | Display and change specific memory locations. Use only when directed to by Midon Design | MEM <start location><cr> |
| MOM | Set or disable Momentary relay function | MOM <on\|off> |
| PLx | Pulses any relay or all relays from current state to the opposite state | PLx<br>Where x = 1 to 4 |
| RLT | Set the timer duration for the relay wait period | RLT xx<br>Where x = 00 to 99 minutes (or seconds) of wait period |
| RLx | Actuate a specific relay | RLx <on\|off><br>Where x = 1 to 4 or A for All |
| RLS | Display the Relay states | RLS |
| RTC | Relay Timer Cancel – stop the timer when in momentary mode | RTC |
| SER | Display the serial number | SER |
| SPR | Enable or disable power on restore of relay states | SPR <on\|off> |

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| Command | Description | Syntax |
|---|---|---|
| TYP | Set the type of time interval desired by the relay timer | TYP <S\|M><br>Where S = Seconds or M = Minutes |
| VER | Displays the current version of the software loaded | VER |
| ZZZ | Resets RS232Relay | ZZZ |

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## 7. Software Change History

**Table 3 RS232Relay Software History**

| Version | Date | Major Changes from Previous Loads |
|---------|------|-----------------------------------|
| 3.02 | 2022/01/18 | • Modified to match PCB Version E. |
| 3.01 | 2020/04/26 | • Modified to match PCB Version D and NEW processor. |
| 1.04 | 2009/09/01 | • Final production version of software |

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## 8. Trouble-Shooting Problems with RS232Relay

The most common problems associated with using RS232Relay are listed in the following table. If these instructions do not result in better results with your RS232Relay, please feel free to contact Midon Design at support@midondesign.com. We would be more than happy to assist you.

**Table 4 Common RS232Relay Problems and Resolutions**

| Problem | Possible Causes |
|---------|-----------------|
| I cannot display RS232Relay output on my PC | Ensure that you are connected with the proper settings (9600 bps, no parity) and that you are using a straight-through, not a null-modem, serial cable |
| I cannot see what I type on Hyperterm (or other terminal software) | This is normal for Hyperterm versions that come pre-packaged with some versions of Windows. Upgrade to a commercial version of Hyperterm or use different terminal emulator software. Some versions will allow you to set the "echo local characters" functionality. Review your specific software's help instructions to determine if it has that capability. |
| Relays turn off (or on) by themselves | You have enabled Momentary mode. If this is not desired, disable Momentary mode with the `MOM Off` command. |

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## 9. Error Messages

**Table 5 RS232Relay Error Messages**

| Message | Description |
|---|---|
| `? Entry error` | You have made a syntax error in entering a command or a parameter |
| `? Input Timeout` | A parameter was not received within 10 seconds of starting a command |
| `? Wait until timer expired` | You are in Momentary mode and tried to change a relay before the timer expired. Use the RTC command to cancel the timer and try again, or wait for the timer to expire. |
| `? Command not valid`<br><br>`Momentary Relay Action = Off` | You are trying to use a relay timer command while MOM is off. Enable MOM. |

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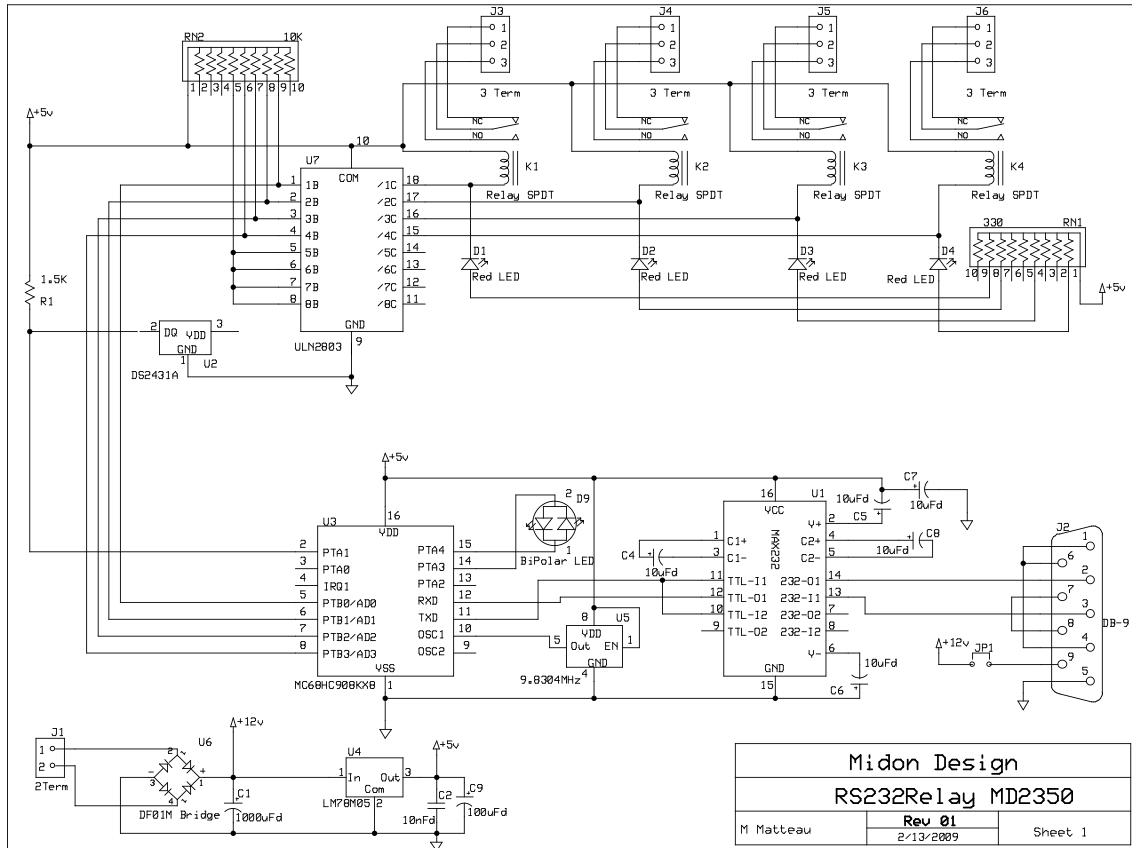
## 10. RS232Relay Schematic
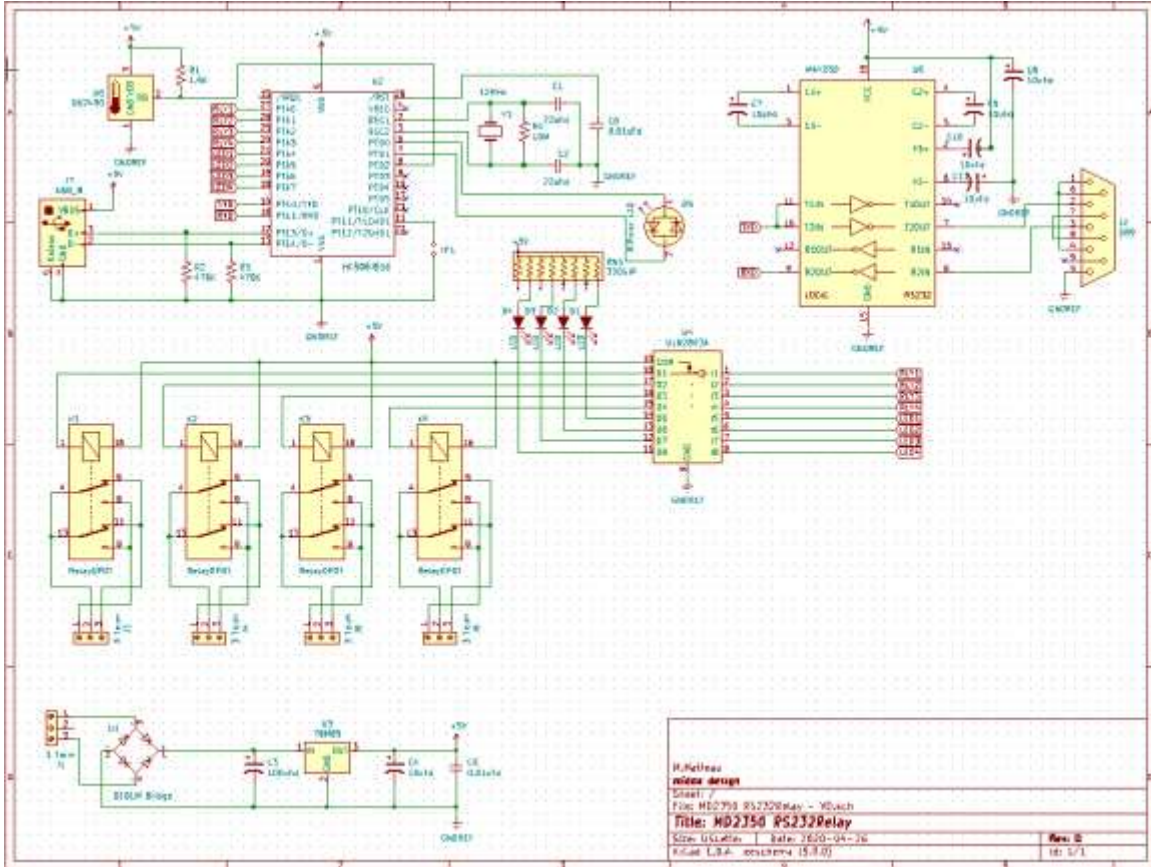


**Figure 5 RS232Relay Schematic (Version C PCB)**

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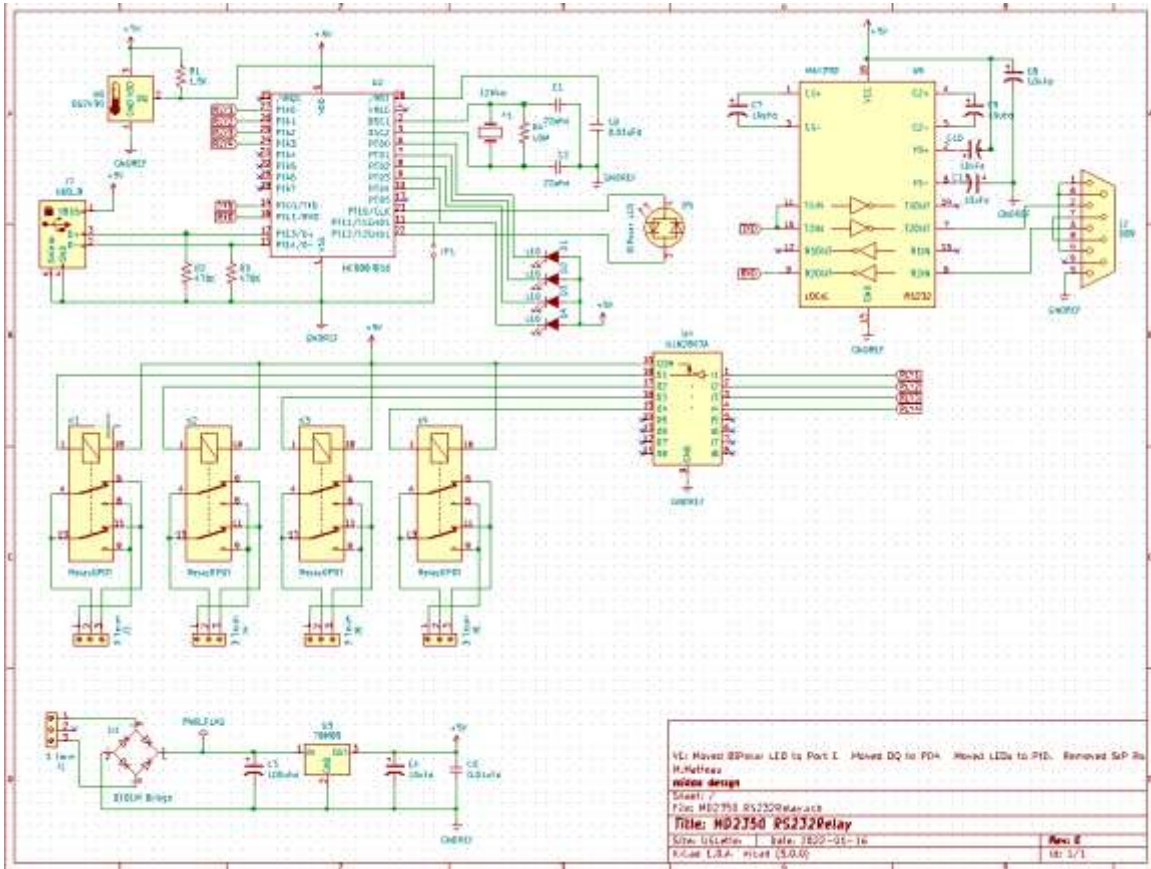**Figure 6 RS232Relay Schematic (Version D PCB)**

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**Figure 7 RS232Relay Schematic (Version E PCB)**

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## 11. Legal Disclaimer

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# Thank you!

Your comments are appreciated. If you would like to submit feature requests or product recommendations, please e-mail us.

**support@midondesign.com**

**End of Document**