AR-8MF
MULTI-FUNCTION
RELAY INTERFACE

(TECHNICAL REFERENCE)
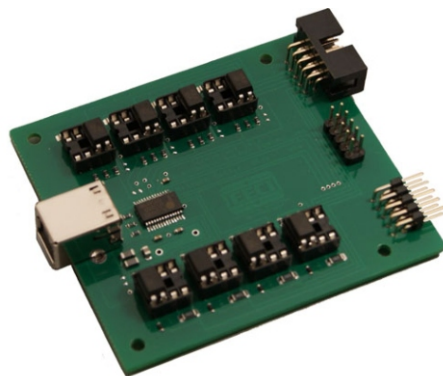
Click for more info: www.eeci.com/ar-8mfp.htm

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Click for Website

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SPECIFICATIONS

Power Supply....................... 5VDC (powered from USB port)

Serial Data Protocol............. 75 to 6,000,000 baud - auto detect (defaults to 115,200 baud)
(data bits, parity, stop bits will auto detect)

Channels.............................. 8 relays/outputs or 8 inputs (or combinations)

Input Voltage Range............ 3.3 volts up to 18 volts (default) other voltage ranges available
Minimum 1.5ma needed to turn input on (DC or AC)

Output Signal....................... Photo transistor, maximum 100mW draw (20ma at 5V)
switching voltage range 3.3 VDC to 48 VDC

Expansion Capability............ expandable to control up to 144 relays/inputs (or combinations)
using EXM-8, EXM-16 or EXM-32 Relay I/O Expansion Modules

Interface.............................. USB (also available in WiFi version (AR-8MFWIFI), Ethernet version (AR-8MFENET)
RS-232 version (AR-8MF232) or RS-485 version (AR-8MF485))

Weight................................. 1.25 ounces

Size..................................... 2.75 inches by 3.1 inches

Options Available................. Dual I/O Port

DESCRIPTION

The AR-8MF provides software control of 8 relays/outputs or monitoring of 8 inputs (or combinations of inputs and outputs). An optional dual I/O mode will allow input of information along with relay control. The input mode will provide input interfacing for on/off equipment status, keypads or other types of digital signals. Inputs may be used to monitor contact status or to monitor AC or DC voltages (+) or (-) 3.3 volts to 18 volts (other voltage ranges available). The optically isolated inputs are bidirectional and may be used with a positive common, a negative common or AC signals. Multi-Function capability allows connection of a variety of 8 bit I/O devices. A large variety of relay cards may be connected.

24 HOUR TECHNICAL SUPPORT

Technical support for our products is available by calling (937) 349-6000. If a technical adviser is not available, please leave your name, phone number and a time that you can be reached. Your call will be returned as soon as possible and within 8 hours. Calls received during normal business hours are usually returned within minutes.

CONNECTION DIAGRAM

A R - 8 M F
M U L T I - F U N C T I O N
R E L A Y   I N T E R F A C E
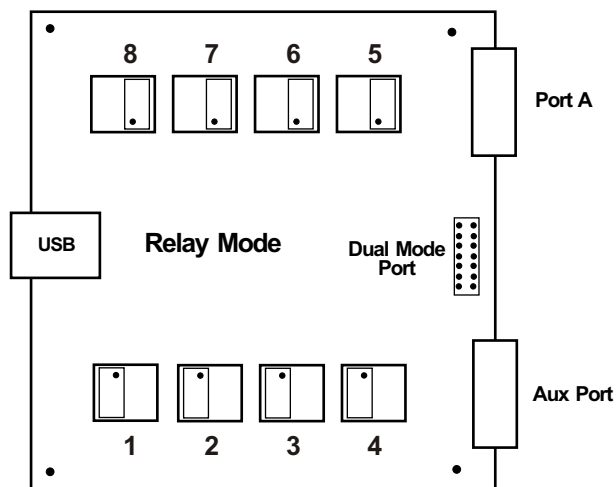
The opto isolator positions above are shown in their default position (all set for relay mode)
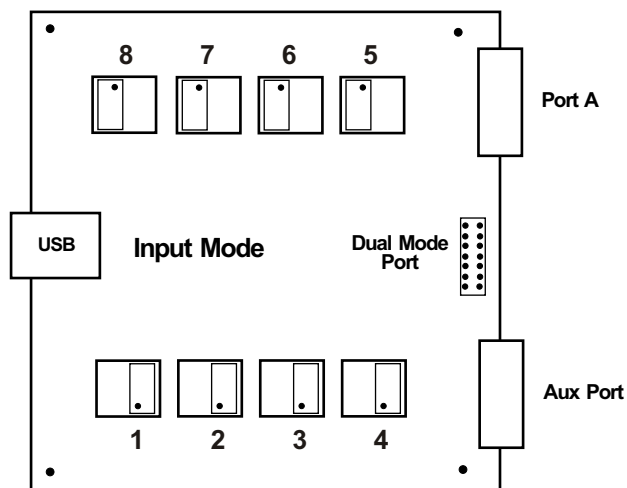
The opto isolator positions above are all shown in input mode

IMPORTANT: Always discharge any static electricity from your body by touching the bare metal on the back of your computer before handling your AR-8MF Interface card or attached USB cable.

SET-UP AND TESTING

Upon receiving your AR-8MF, you should connect and test the operation of the hardware to verify proper operation. Please set-up and test the AR-8MF as follows (Windows XP*, Vista, Windows Server 2008, 2012, Windows 7, 8 or later) *service pack 3

(1) Connect your AR-**8**MF Relay Interface to your computer USB port using a CC-USBB cable (1 to 10 foot). A high percentage of systems will already have a USB Com driver installed and this is indicated by a pop up balloon in the lower right side of your screen. The balloon message may automatically assign a com port to your AR-8MF and the com port assigned will be shown. If this occurs then make note of the com port for step 4 and go to step 2. The balloon message may also indicate that a driver has been located on your system and is being installed and after which a com port is assigned to the AR-8MF. If this occurs then make note of the com port for step 4 and go to step 2.

The balloon message may request to search Windows Update for the correct driver. If you are connected to the Internet, you may click yes and allow the USB com driver to be installed and after which a com port is assigned to the AR-8MF. If this occurs, then make note of the com port for step 4 and go to step 2.

With Windows XP, the "Found New Hardware Wizard" may pop up. If you have an Internet connection, allow the wizard to connect to Windows Update and install the USB com driver, then go to step 2.

If none of the above actions occur or if an error message is shown, you may install the USB Com driver* from the supplied CD by clicking the "Install USB Com Driver" button in the CD start window. After the USB com driver is installed, disconnect your AR-8MF from the USB port, wait 5 seconds and plug back in. You may see a balloon message with the com port assigned to the AR-8MF (if not, you will find the com port assigned in step 2).

*before installing a new USB com driver, go to Control Panel/Device Manager/Ports to check if a Prolific driver is shown (expand the category by clicking on the + or arrow). If you see a "Prolific USB to Serial Comm Port (COM-)" entry, the number to the right of COM is your com port. Right click on the entry, then properties, then the driver tab to check the version. If you have an out of date version and an Internet connection, click the "Update Driver" button to install the updated driver. Please note that it may be necessary to remove the outdated Prolific Com driver before the updated driver will correctly install (the supplied CD driver installation feature has a remove option - click Install Com Driver).

(2) Check your USB Com driver by going to Control Panel/Device Manager/Ports (see detail on the next page for your Windows version) or click the "Open Control Panel" button on the supplied CD start window. Click the small triangle (or +) to the left of Ports to expand the Ports category, right click the Prolific USB to Serial Comm Port, click properties and open the driver tab. Your USB Com driver must be Prolific version 3.4.62.293 or higher (dated 10/17/2013 or later). If your USB Com driver is up to date then please note the Com port number assigned and jump to step 3.

If your USB Com driver is not up to date, click the "Update Driver" button (under driver tab). If the driver does not update, disconnect the AR-8MF USB cable from your computer and install the updated USB Com driver (located on your AR-8MF CD from the start window, in the USB Com driver folder or from Windows Update). Please see detail*

(3) After you have verified or installed an up to date USB Com driver, reconnect your AR-**8**MF Relay Interface to any available USB port on your computer and insert the AR-8MF CD. Install the AR-8MF Software Interface* by clicking the "Install Software Interface" button in the CD start window (if you have auto-start disabled, you may browse to the Windows Test Program folder and double click on setup.exe). A desktop icon for the AR-8MF will be created.

*Please note that the Microsoft .Net Framework must be installed on your system. If the .Net Framework is not installed on your computer, the installation program (AR-8MF Software Interface) will attempt to download and install the .Net Framework from the Microsoft web site through your internet connection. This may take 5 minutes or longer. In order for the .Net Framework to install correctly, your computer must be up to date with Windows update. This is especially important with Windows XP and Vista. You may update your computer by clicking on the start button, All Programs, Windows Update and clicking on "Check for Updates".

(4) After the AR-**8**MF Software Interface is installed, a pop-up will prompt you for the com port to be used with the AR-8MF Relay Interface. Enter the com port that was assigned in step 1 or 2. The label just under the COM port indicator should show that com port open in the AR-8MF Software Interface.

(5) Test your relays by clicking the relay buttons for each relay. The relay should energize when the button is red and de-energize when the button is green.

(6) You may set your AR-**8**MF Relay Interface to input mode by reversing the opto isolators* on the circuit board as shown on page 2 and connecting the RCT-8 terminal block to port A on your AR-8MF Relay Interface (unplug relay card).
*Note: when using the dual I/O mode, the opto isolators should be left in the relay mode (dual mode port required).

(7) Test your inputs by clicking the Setup button on the AR-**8**MF Software Interface and then checking all 8 input boxes. Click apply and then click OK. The indicator box to the right of the relay button will show a zero when no voltage is applied to the input terminal on the RCT-8 and a one when voltage is applied to the input terminal. Terminal 10 on the RCT-8 is the common (- or +) for all eight inputs. The default voltage input range for the AR-8MF is 3.3V to 18 volts (DC or AC). See page 6 for RCT-8 terminal assignments.

HOW TO OPEN DEVICE MANAGER

Windows XP, VISTA or Windows 7

Click the Start Button (lower left of screen), then Control Panel (right side). With the view set to classic view, small or large icons, click (or double click) the Device Manager icon. With Windows XP you will need to click the System icon (in Control Panel) then the Hardware Tab then the Device Manager button. You may also use the supplied CD to open Device Manager by clicking the "Open Device Manager" button when the CD auto starts.
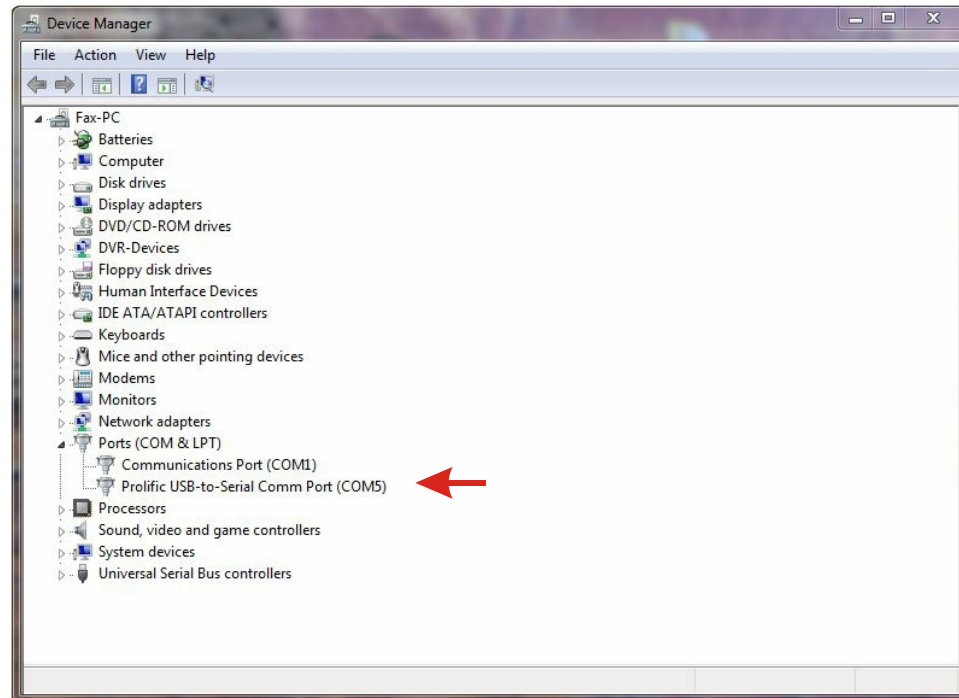
HOW TO OPEN DEVICE MANAGER (continued)

Windows 8, 8.1 and Windows Server 2012

Move your mouse cursor to the lower right side of your screen and click on Settings. Click on Control Panel near the top and dlick on the Device Manager icon.

TROUBLE-SHOOTING THE AR-8MF

(1) Verify that your USB com driver is installed by going to Device Manager and checking for the Prolific USB to Serial Comm Port entry. Right click on the entry, then Properties, select the Driver tab and verify that the driver is dated 8/15/2014 or later. If the driver is out of date, connect to the Internet and click the Update Driver button. Please note that an out of date driver may allow the AR-8MF to partially function and/or with erratic operation.

(2) Verify that the Prolific USB to Serial Comm Port entry is the com port used by your AR-8MF. You may do this by watching the entry in Device Manager and unplugging your AR-8MF from your computer USB port. The entry should disappear and then re-appear when you plug the AR-8MF back in to your computer USB port.

(3) Verify that the relay card that you are using has 5V relay coils (shown on top of each relay) when powering from USB. Verify that you are suppling 12VDC to the relay card when the relay card is connected via ribbon cable (relays will show 12VDC on top). A multi-meter may be used to measure the voltage and for the correct polarity.

(4) Try replacing the USB cable and/or using a different USB port.

(5) Verify that the AR-8MF Software Interface is correctly installed and running. Click the blue 8 icon in your system tray (bottom right) and check for the correct com port setting (should show the correct com port open). If the window below the COM indicator shows "COM Not Found!" then a com port issue is the problem (check for another program that may be using the com port). You may right click the taskbar at the bottom of your screen, then Task Manager to view running applications (select the processes tab).
.
(6) Remove the AR-8MF USB cable from your computer, wait 5 seconds and plug back in. Open the AR-8MF Software Interface by clicking on the blue 8 icon in your system tray and double click on the blue EECI logo to reset the com port. You should see a reset message followed by a COM open indication. Click Setup and uncheck "Allow External Commands". If this corrects the issue that you are experiencing then an external application is the problem.

USING THE AR-8MF INPUT MODE
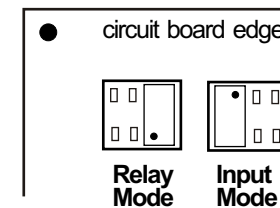
Each channel may be set independently for input mode or to control a relay. Channel numbers are located next to the 8 pin sockets.

Inputs are turned on with a voltage input or contact closure. The default voltage input range is 3.3 volt up to 18 volts. Any voltage within this range will turn on the input as long as a minimum of 1.5ma is supplied. The voltage may be AC or DC and may have a common (+) or a common (-). Other voltage ranges are available.

A channel is set to relay/output mode by placing the opto coupler on the right side of the 8 pin socket with the dot on the opto coupler away from the edge of the circuit board (as shown above).
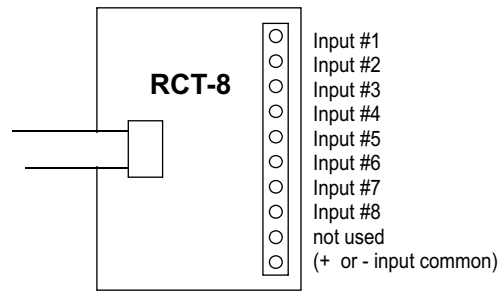
A channel is set to input mode by placing the opto coupler on the left side of the 8 pin socket with the dot on the opto coupler closest to the circuit board edge.

When using the dual I/O mode, all opto couplers should be left in the relay mode position (output).
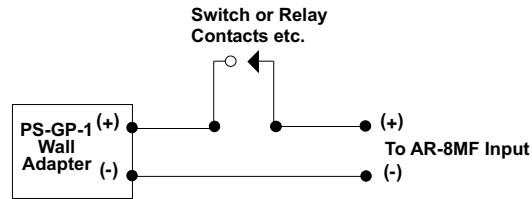
USING THE AR-8MF INPUT MODE (continued)

PORT A Input connections

```
         ┌─────────────┐
         │ ○           │ Input #1
         │ ○           │ Input #2
  RCT-8  │ ○           │ Input #3
         │ ○           │ Input #4
         │ ○           │ Input #5
         │ ○           │ Input #6
         │ ○           │ Input #7
         │ ○           │ Input #8
         │ ○           │ not used
         │ ○           │ (+  or - input common)
         └─────────────┘
```

The PS-GP-1 wall adapter (or other power source) may be used to monitor for a contact closure (shown below). The 5 volt USB power feed on the Aux Port may also be used, but it is best to maintain electrical isolation from the USB port to protect your computer and the AR-8MF.

```
                    Switch or Relay
                    Contacts etc.
                        ○
                         ↖
  ┌──────────┐  (+) ●────●      ●───● (+)
  │ PS-GP-1  │                      To AR-8MF Input
  │  Wall    │
  │ Adapter  │  (-) ●──────────────● (-)
  └──────────┘
```

USING THE OPTIONAL AR-8MF DUAL I/O MODE

The dual I/O port permits the AR-8M to be switched back and forth from relay mode to input mode from software. This switching can occur at a very high rate if needed for I/O devices. The inputs are no longer connected via Port A so that relays or outputs may remain connected to the Port. Inputs are connected to the 10 pin header in the middle (between Port A and the Aux Port). An auxiliary card with opto isolators and a 10 position terminal block is attached to the 10 pin header to allow the inputs to be connected.

The dual I/O port is useful in security applications where a manual door opener device is used to unlock a door (by energizing an AR-8MF relay) while at the same time logging the event using the same AR-8MF channel switched to input mode (or other types of scenarios). Please contact EECI technical support for more information.

USING THE AR-8MF OUTPUT MODE

The AR-8MF outputs have a photo transistor output that is capable of directly driving LEDs, solid state relays, small reed relays and other devices that require 100mW or less of power to operate (use the RCT-8 terminal block to connect, see page 12). The maximum voltage that may be applied to pin 9 on Port A is 48 volts DC. The maximum allowed current through the photo transistor must be limited to 20ma at 5 volt, 10ma at 10 volts, 5ma at 20 volts and lower at higher voltages (ratio metrically). A variety of relay cards and relays are available for connection to the AR-8MF outputs. The RYD-8 driver card may be used to directly power devices that require more then the 100mW that the photo transistors allow. The RYD-8 may be used to control large power relays, contactors or other devices that draw up to 3 amps or less. See page 2 or 5 for the opto isolator position for output (relay mode).

THE AR-8MF SOFTWARE INTERFACE

The AR-8MF Software Interface allows you to set all of the basic operating characteristics of the hardware and permits the AR-8MF to send and receive data from other Windows applications or programs that you create.

When the software interface is started for the first time you are prompted for the com port that is to be used with the AR-8MF. This com port number is saved in the settings file "ar8mf-set.ini" which is created in the folder c:\eeci\ar-8mf. The interface will then start using the com port assigned. The com port indicator should have a "COM Open" message as shown to the left with the correct com port shown. The com port may be changed by clicking the Setup button and changing the com number in the Com Port window and clicking Apply.

You can manually set the state of the relays by clicking on the relay buttons. The button will turn red when the relay is energized and will turn green when the relay is de-energized. Clicking a relay button with that channel set to input mode will turn off input mode and force that channel into relay mode. The button names may be changed using Setup. The two boxes below the com indicator show the outgoing relay control byte for use with external Windows applications. The box on the top shows the control byte for relays 1 thru 8 and the box on the bottom shows the control byte for inputs 1 thru 8 enable.

Clicking the Setup button allows you to set the input enable for each of the 8 channels. Checking the box for an input sets that channel to input mode (opto isolator must be in the input position if the dual I/O port is not in use - see page 2 and 5). The com port, baud rate and sampling rate settings are changed below. Un-checking the Allow External Commands box will prevent other Windows applications from sending or receiving data from the AR-8MF. A password protected version of the AR-8MF Software Interface is available. Please contact technical support for more information.

The AR-8MF Software Interface may be started hidden by checking the Start Minimized box. Any changes made to Setup will not take effect until you click the Apply button. Clicking the Apply button saves the new settings to the ar8mf-set.ini file so that if the software interface is shut down, it will restart with all the new settings. Click the Hide button to close the window after the AR-8MF Software Interface is set-up for your application. A blue 8 icon will appear in your system tray (click to re-open the software interface). The AR-8MF Software Interface may be completely shut down by clicking the red X on the top right of the software interface. Once shut down, you will need to double click the AR-8MF desktop icon to re-start the AR-8MF Software Interface (or clicking the AR-8MF icon under All Programs in the EECI folder).The Help button will provide additional assistance if you installed the Tech Reference from the AR-8MF installation CD.

USE OF THE AR-8MF WITHOUT THE MICROSOFT .NET FRAMEWORK

Inputs 6, 7 and 8 will function without the installation of the .Net Framework, allowing the use of 3 inputs with older operating systems. The inputs may be used by reading the status of DCD, DSR and CTS. The inputs may be tested by installing the universal AR-2 test program from the EECI support web page (file ar2.zip). The source code examples for the AR-2S may be used to read the status of DCD, DSR and CTS.

AR-8MF CONTROL SOFTWARE

The software control interface uses just 3 bytes to send and receive data to and from the AR-8MF. One byte is used for relay control, one byte is used for input enable control and one byte is used for monitoring inputs. Shown below is a description of these control bytes:

bit 7   bit 0

RELAY BYTE: **00110101**   controls Relays 1 thru 8

relay 8   relay 1

The above byte shows relays 1, 3, 5 and 6 energized with a decimal equivalent of 53.
To energize all 8 relays, set all bits to 1 (decimal equivalent of 255).
To de-energize all 8 relays, set all bits to 0 (decimal equivalent 0).

INPUT ENABLE BYTE: **11000100**   sets channels 1 thru 8 to Input Mode

The above byte shows inputs 3, 7 and 8 enabled with a decimal equivalent of 196.

INPUT BYTE: **00110001**   provides state of Inputs 1 thru 8

The above byte shows inputs 1, 5 and 6 turned on (decimal equivalent 49).

The AR-8MF relays are controlled by sending the Relay Control Byte to the AR-8MF Software Interface.

The AR-8MF channels are switched to Input Mode or Relay Mode by sending the Input Enable Byte to the AR-8MF Software Interface.

These 2 control bytes (Relay and Input Enable) may be sent one at a time or both and in any sequence.

The state of the AR-8MF inputs are determined by reading the Input Byte. Bits set high indicate that the input is on.

The update rate of the relay/outputs and/or inputs are set in the AR-8MF Software Interface by clicking the Setup button, entering the Sample Rate and clicking Apply. The default rate is 200ms (5 times per second). The Allow External Commands box in Setup must be checked in order for other applications to interact with the AR-8MF.

Shown on the following page are several examples for use with the Microsoft .Net Framework. These examples will run in all versions of Visual Studio including Visual Studio Express. The supplied AR-8MF Software Interface is most widely used with Microsoft Visual Studio and the programming languages Visual Basic, Visual C#, Visual C++ and ASP.Net which are the source codes that the AR-8MF Software Interface has been developed around. The AR-8MF Software Interface is available in several other variations which may be more suitable for alternate programming languages (including interfacing to older DOS programs if needed). Please contact EECI technical support for more information.

SIMPLE PROGRAMING EXAMPLE IN MICROSOFT VISUAL BASIC .NET

AR-8MF Relay Control Example

To use this example in Visual Basic, copy the code module (supplied on your CD) to a sub called setRelay(). From the toolbox drag two buttons and a textbox to your form. Insert the following code into the button click subs. One button will energize the relay number that you enter into the textbox. The other button will de-energize the relay.

```
Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
    relay = Int(Val(TextBox1.Text))          'set variable relay to an integer 1 to 8
    If relay > 0 And relay < 9 Then setRelay()    'set AR-8MF relay - energize relay
End Sub

    Private Sub Button2_Click(sender As Object, e As EventArgs) Handles Button2.Click
    relay = Int(Val(TextBox1.Text)) + 8          'set variable relay to an integer 9 to 16
    If relay > 8 And relay < 17 Then setRelay()  'set AR-8MF relay - de-energize relay
End Sub
```

AR-8MF Input example

To use this example in Visual Basic, copy the code module (supplied on your CD) to a sub called readInputs(). From the toolbox, drag (8) labels and a timer control to your form. Insert the following code into the timer sub. The state of the (8) AR-8MF inputs are displayed in labels 1 through 8.

```
Private Sub Timer1_Tick(sender As Object, e As EventArgs) Handles Timer1.Tick
    readInputs()                               'collect inputs status

    If inputs <> inputByte(0) Then             'have inputs changed?
        Z = 1                                  'select bit 0  (first byte)
        For W = 1 To 8
            B = inputByte(0) And Z             'check bit
            If B > 0 Then MyLabelArray(W).Text = "1" Else MyLabelArray(W).Text = "0"    'bit set?
            Z = Z * 2                          'advance to next bit
        Next W
        inputs = inputByte(0)                  'input states 1 to 8 are stored in inputByte(0)
    End If

End Sub
```

THE AR-8MF DATA LOGGER

The AR-8MF Software Interface provides a data logger function that will save digital input readings to a file at preset time intervals. Label and event values may be factored into the recorded data event along with time and date by entering the desired values at the setup screen by clicking the Event Setup button. The AR-8MF data logger may be used stand alone if an external application is not used. The file output format may be set to plain text, CSV or text delimited formats and may be imported into database or spreadsheet applications if required. The data log interval may be set to seconds or minutes by clicking the button to the right of the setting. A suffix may be added to the logged value (such as Open, Closed, On, Ready, Malfunction, etc.). Extended ASCII characters may be added by holding down the alt key and entering the ASCII code on your keyboard keypad. Example: to display a degree symbol, hold down the alt key and enter 248 on your keypad. The ON/OFF setting allows you to log your data event based on the on/off state of the input.

SIMPLE PROGRAMING EXAMPLE IN MICROSOFT C# .NET

AR-8MF Relay Control Example

To use this example in Visual C#, copy the code module (supplied on your CD) to a sub called set_relay(). From the toolbox drag two buttons and a textbox to your form. Insert the following code into the button click subs. One button will energize the relay number that you enter into the textbox. The other button will de-energize the relay.

```
private void button1_Click(object sender, EventArgs e)
    {
        relayNumber = Convert.ToInt32(textBox1.Text);
        relayByte = relayByte |= 1 << relayNumber-1;        //set relay bit
        set_relay();                                        //energize relay
    }
    private void button2_Click(object sender, EventArgs e)
    {
        relayNumber = Convert.ToInt32(textBox1.Text);
        relayByte = relayByte &= ~(1 << relayNumber-1);     //clear relay bit
        set_relay();                                        //de-energize relay
    }
```

AR-8MF Input example

To use this example in Visual C#, copy the code module (supplied on your CD) to a sub called read_inputs(). From the toolbox, drag (8) labels and a timer control to your form. Insert the following code into the timer sub. The state of the (8) AR-8MF inputs are displayed in labels 1 through 8.

```
private void timer1_Tick(object sender, EventArgs e)
    {
        read_inputs();          //collect the status of inputs from the AR-8MF

        bitOfByte = 0;          //set to input 1
        check_bit();            //determine if input bit is set
        if (bit == true){
            label1.Text = "1";  //display input state
        }
        else {
            label1.Text = "0";
        }

        bitOfByte = 1;          //set to input 2
        check_bit();
        if (bit == true)
        {
            label2.Text = "1";
        }
        else
        {
            label2.Text = "0";
        }

    }
    private void check_bit()
    {
        bit = (inputByte[0] & (1 << bitOfByte)) != 0;   //determine if bit is set - bit 0 to 7 - result bool
    }
```

RELAY RESPONSE SPEED

The speed at which the relays respond to a software command is directly related the baud rate setting of the AR-8MF and the sample rate set in the AR-8MF software interface. The higher the baud rate setting, the faster a relay (or group of relays) will respond to software transmissions. The default setting of 115,200 baud will allow your software to energize and de-energize groups of relays almost instantly when the sample rate is set to 5 ms (located in the AR-8MF Software Interface Settings).
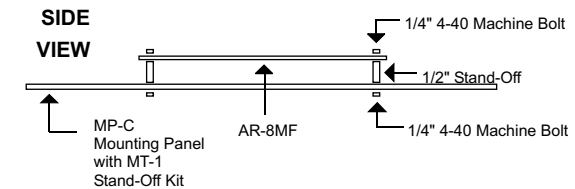
AUTO START-UP FOR THE AR-8MF SOFTWARE INTERFACE

To automatically start the AR-8MF software interface, copy your AR-8MF desktop icon (right click) and paste in your computer Startup folder. In Windows XP up through Windows 7, the start-up folder is located by clicking your Start button and clicking on All Programs then scrolling down to the Startup folder. In Widows 8 and 8.1, mover your cursor to the the lower right of your screen and then click on Search. In Search, scroll all the way right and click "run" (under Windows System). Enter "shell:startup" (no quotes) and click OK.

When the AR-8MF is first powered, the relays which are connected will normally power-up in a de-energised state. It is possible under certain conditions (such as fluctuating power) that the relays may power-up in a random state (several relays may energize, while others may not). Your program should reset all the relays to a known state when your program is first started.

MOUNTING

The AR-8MF Mult-Function Relay Interface card may be mounted in an enclosure or on a metal mounting panel using the MT-1 stand-off mounting hardware as shown below. The AR-8MF will attach to the 4 stand-off spacers using 4-40 machine screws (4 mounting holes are provided on the AR-8MF). Contact technical support for more information on mounting panels and various mounting layouts.

SIDE VIEW — 1/4" 4-40 Machine Bolt, 1/2" Stand-Off, MP-C Mounting Panel with MT-1 Stand-Off Kit, AR-8MF, 1/4" 4-40 Machine Bolt

RELAY INTERFACING

In the event that you wish to use existing control relays with the AR-8MF, you may use the RYD-8 relay driver card or construct a relay driver circuit as shown below. The voltage and current output of the relay output port is too low for most relays (with the exception of some types of solid state relays and reed relays). We recommend the use of the following circuit to drive most types of mechanical and reed relays with 12 volt DC coils (200 MA maximum).
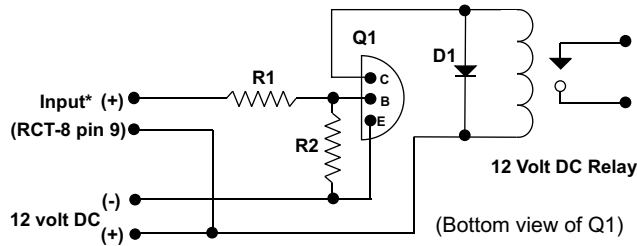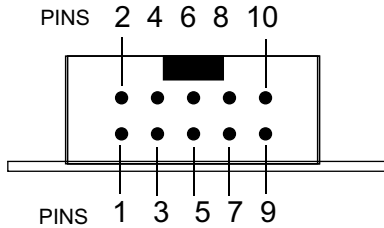

PARTS LIST

(Q1) NPN Transistor...MPS6560 or
    (Radio Shack 276-2009)
(D1) Diode............1N4148 or
    (Radio Shack 276-1122)
(R1, R2) Resistor......3K, 33K
    (Radio Shack 271-1328, 1341)
(Relay) Radio Shack 275-214,
    275-206, 275-233 or
    equivalent

*connect to opto isolator output from the AR-8MF using the RCT-8 (pin 9 is common)
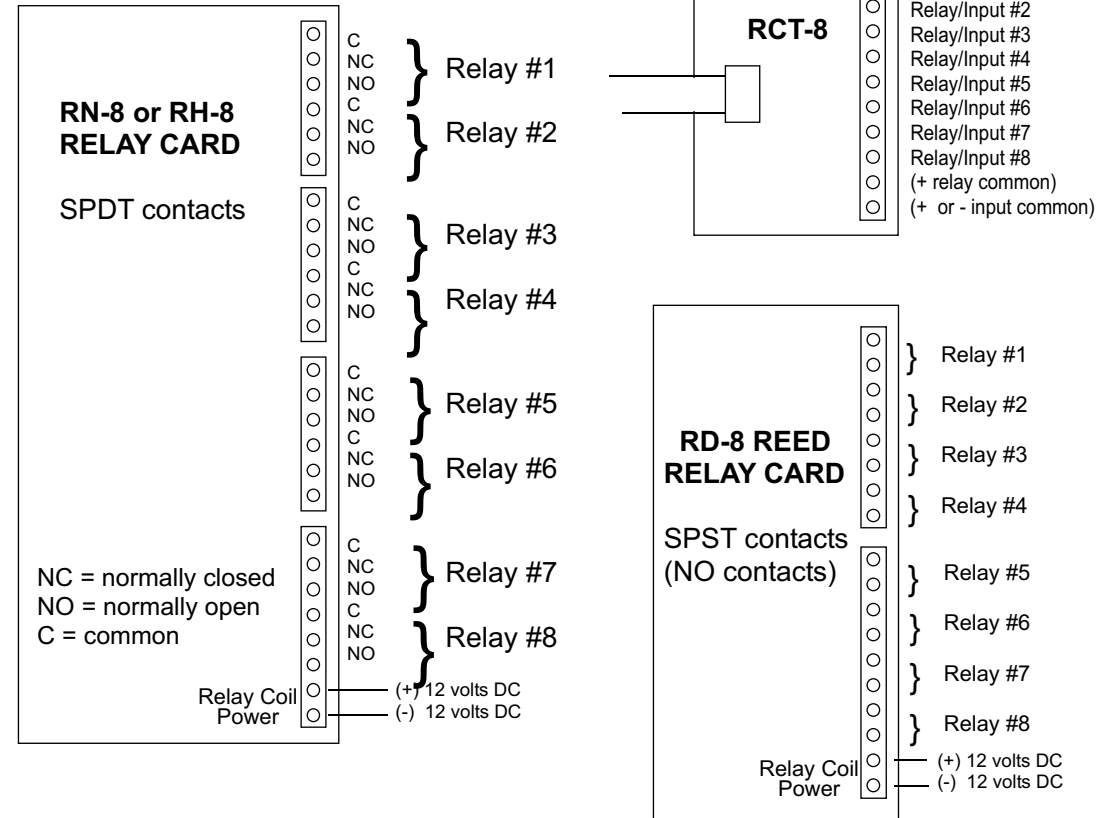
PORT A HEADER CONNECTOR PIN-OUT

PINS 2 4 6 8 10

PINS 1 3 5 7 9

HEADER PIN-OUT FOR PORT A
ON THE AR-8MF

NOTE: Key notch is on top.
View is looking into header pins.

PIN CONNECTIONS

(1) Relay #1 or Input #1
(2) Relay #2 or Input #2
(3) Relay #3 or Input #3
(4) Relay #4 or Input #4
(5) Relay #5 or Input #5
(6) Relay #6 or Input #6
(7) Relay #7 or Input #7
(8) Relay #8 or Input #8
(9) Opto (+) (used for relay control only)
(10) Signal Common (used for inputs only)

CONNECTION DIAGRAMS FOR RELAY CARDS AND RCT-8

RN-8 or RH-8 RELAY CARD

SPDT contacts

NC = normally closed
NO = normally open
C = common

Relay Coil Power
(+) 12 volts DC
(-) 12 volts DC

RCT-8

Relay/Input #1
Relay/Input #2
Relay/Input #3
Relay/Input #4
Relay/Input #5
Relay/Input #6
Relay/Input #7
Relay/Input #8
(+ relay common)
(+ or - input common)

RD-8 REED RELAY CARD

SPST contacts
(NO contacts)

Relay Coil Power
(+) 12 volts DC
(-) 12 volts DC

SPECIFICATIONS RH-8 RELAY CARD

Size.. 2.75" by 6"
Weight................................... 8 ounces
Number of Relays.................. 8
Contact rating (AC)................ 12 amp 250 VAC*
Contact rating (tungsten)....... 3 amp 360 watt
Contact rating (DC)............... 12 amp 24 VDC
Contact rating (horsepower)... 1/3 HP 240 VAC
Contacts............................... SPDT
Power requirements............... 12 volts DC 500ma
Terminal block rating.............. 125 volts
Optional heavy duty block...... 250 volts

SPECIFICATIONS RD-8 REED RELAY CARD

Size.. 2.25" by 4.875"
Weight................................... 3.5 ounces
Number of relays................... 8
Contact rating (DC)............... 10 VA 200 VDC*
Contact rating (AC)............... 10 VA 200 V peak*
Max switching current........... 1/2 amp
Contacts............................... SPST
Power requirements.............. 12 Volts DC 200ma
Terminal block rating.............. 125 volts
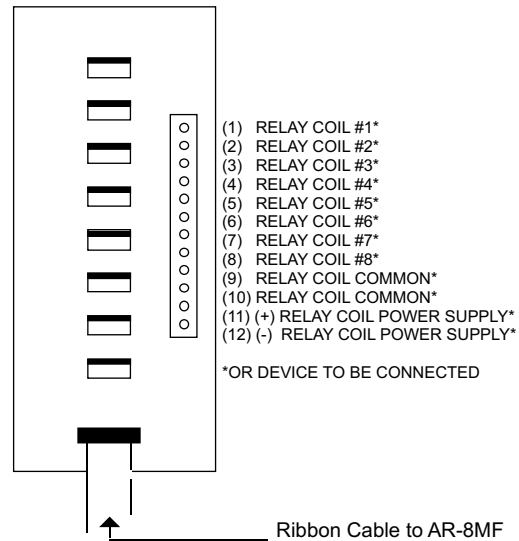Optional heavy duty block...... 200 volts
* resistive

CONNECTION OF THE RYD-8 TO THE AR-8MF

SPECIFICATIONS RYD-8 RELAY DRIVER CARD

Size.. 2.25" by 4.875"
Weight................................... 2.5 ounces
Relay Outputs......................... 8
Maximum current rating.......... 3 amp (requires heat sinks above 1.5 amps)
Input voltage range................ 5 to 48 volts DC (voltage must match relay coil requirement)

DESCRIPTION: The RYD-8 relay driver card provides (8) relay drivers for connection directly to relay coils, contactor coils or other devices (such as motors, lamps, solenoids, etc.). The ribbon cable provided with the RYD-8 will connect directly to a relay output port on the AR-8MF Interface which allows the RYD-8 relay driver to provide software control of the relay or device to be connected to the terminal block on the RYD-8. The RYD-8 relay driver card will power relays or other devices which require 3 amps or less and operate within the voltage range of 5 to 48 volts DC. The output voltage of the RYD-8 (for powering the relay coil or device) is equal to the RYD-8 power input which is applied to terminals (11) and (12) on the RYD-8 terminal block. All eight relay coils (or other devices which are connected to the RYD-8) must operate at the same voltage and must operate at the voltage that is applied to terminals (11) and (12) on the RYD-8 terminal block.

RYD-8 CONNECTION DIAGRAM

(1) RELAY COIL #1*
(2) RELAY COIL #2*
(3) RELAY COIL #3*
(4) RELAY COIL #4*
(5) RELAY COIL #5*
(6) RELAY COIL #6*
(7) RELAY COIL #7*
(8) RELAY COIL #8*
(9) RELAY COIL COMMON*
(10) RELAY COIL COMMON*
(11) (+) RELAY COIL POWER SUPPLY*
(12) (-) RELAY COIL POWER SUPPLY*

*OR DEVICE TO BE CONNECTED

Ribbon Cable to AR-8MF

One side of the relay coil of each relay must be connected to one of the relay common terminals (two terminals are provided for all eight relays, terminal #9 and terminal #10).

ALL EIGHT RELAY COILS (or connected device) MUST OPERATE AT THE SAME VOLTAGE.

HEAT SINKS: Heat sinks should be installed on the power transistors on the RYD-8 relay driver card if the relay coil or the device to be connected requires more than 1.5 amps continuous (or 5 watts). A heat sink kit is available for this purpose (specify RYD-8 heat sink kit). Please contact technical support for additional information.
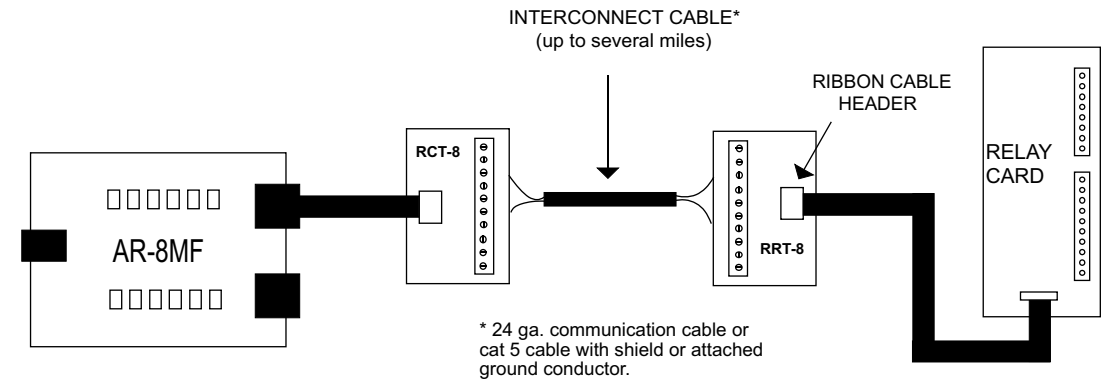
Relays or devices connected to the RYD-8 may be located up to several miles from the RYD-8. The only limiting factor is the voltage drop in the relay interconnect wire. A number of different types of relays with various contact configurations are available for connection to the RYD-8. Contact technical support for more information.

The ribbon cable on the RYD-8 may be connected to any of the relay output ports on the AR-8MF (in the same manner as the relay cards are connected).

REMOTE CONNECTION OF RELAY CARDS OR RELAY DRIVER CARDS

Relay cards may be located up to several miles away from the AR-8MF. Plug the RCT-8 or RCT-16 into Port A and/or Port B of the AR-8MF. The remote relay card may then be connected to the RCT-8 using low cost 24 gauge 6 pair communication cable, cat 5 network cable or other types of cable. The RCT-8, RCT-16 terminal blocks or RCP-8 (DB-9 connector) ribbon cable adapters should be used at the AR-8MF for connection to the interconnect cable (see illustration on page 17). Relay cards may be ordered with a header in place of the ribbon cable or the RRT-8 or RRT-16 terminal blocks may be used to make the connection to the interconnect cable. The relay card ribbon connector may be replaced with a DB-9 connector in place of the header for direct connection to the interconnect cable. All relay cards are available with header sockets, RJ-45 or DB-9 connectors installed in place of the ribbon connector (specify when ordering).

The following illustration shows how relay cards or relay driver cards may be connected to the AR-8MF. The relay card or relay driver card must be powered at the remote location.

INTERCONNECT CABLE*
(up to several miles)

RIBBON CABLE
HEADER

RCT-8

RRT-8

AR-8MF

RELAY CARD

* 24 ga. communication cable or cat 5 cable with shield or attached ground conductor.

WARRANTY AND CARE OF THE AR-8MF

The AR-8MF Relay Interface is warranted against factory defects for a period of 90 days from the date of purchase. The AR-8MF has proven to be extremely reliable in actual operation during field tests. We recommend that the AR-8MF and associated hardware be installed in a suitable enclosure (4 mounting holes are provided on the circuit board) and that reasonable precautions be taken to protect the circuit from static discharge. The most likely damage to occur is that caused by static discharge to the circuit board during handling.

CONTROL SYSTEM
TECHNOLOGY

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