Preliminary

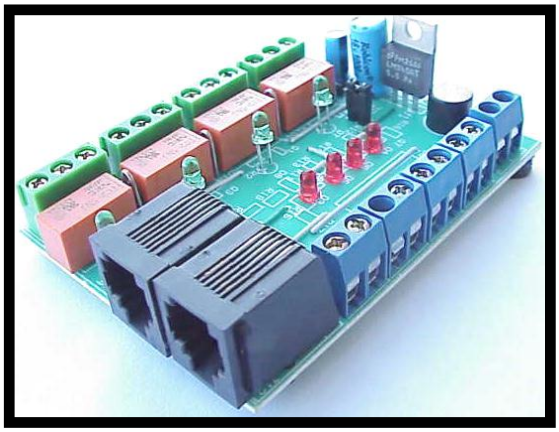
Tecnología Aplicada a la Información

1-Wire® Multiple I/O module

TAI8558

Features

- Four 1-Wire® controlled relays.
- NO and NC relay outputs available
- Maximun Switching Power 60W or 125 VA
- Maximun Switching Voltage 220 Vdc, 250 Vac.
- Four optocoupled AC inputs.
- Eight LEDS for visual feedback of the input/outpus status
- All eight (8) I/Os are brought out to screw terminals so that you can connect to your own remote switches or drive sources and digital on/off sensors.
- More screw terminals for Vcc, Vraw and 1-Wire® MicroLAN® network
- Dallas Semiconductors DS2408 based.
- Dual 1-Wire® RJ12 6 conductor connectors support the common 1-Wire® MicroLAN® network pinout. Compatible with Dallas Semiconductor/MAXIM 1-Wire® and iButton® devices and TINI® socket boards, AAG Electronica TAIxxxx and Systronix TINI® and TILT-Pro® socket boards. The dual connectors permit daisy-chaining additional 1-Wire Net modules.
- Available option with Dallas Semiconductors TAG-ID standard for electronic identification of function.
- Simple interconnect through RJ11 connectors.
- Internal power supply requires only external transformer with 9Vac @ 500ma output.



- Unique 1-Wire address permits multiple sensors on network

Description

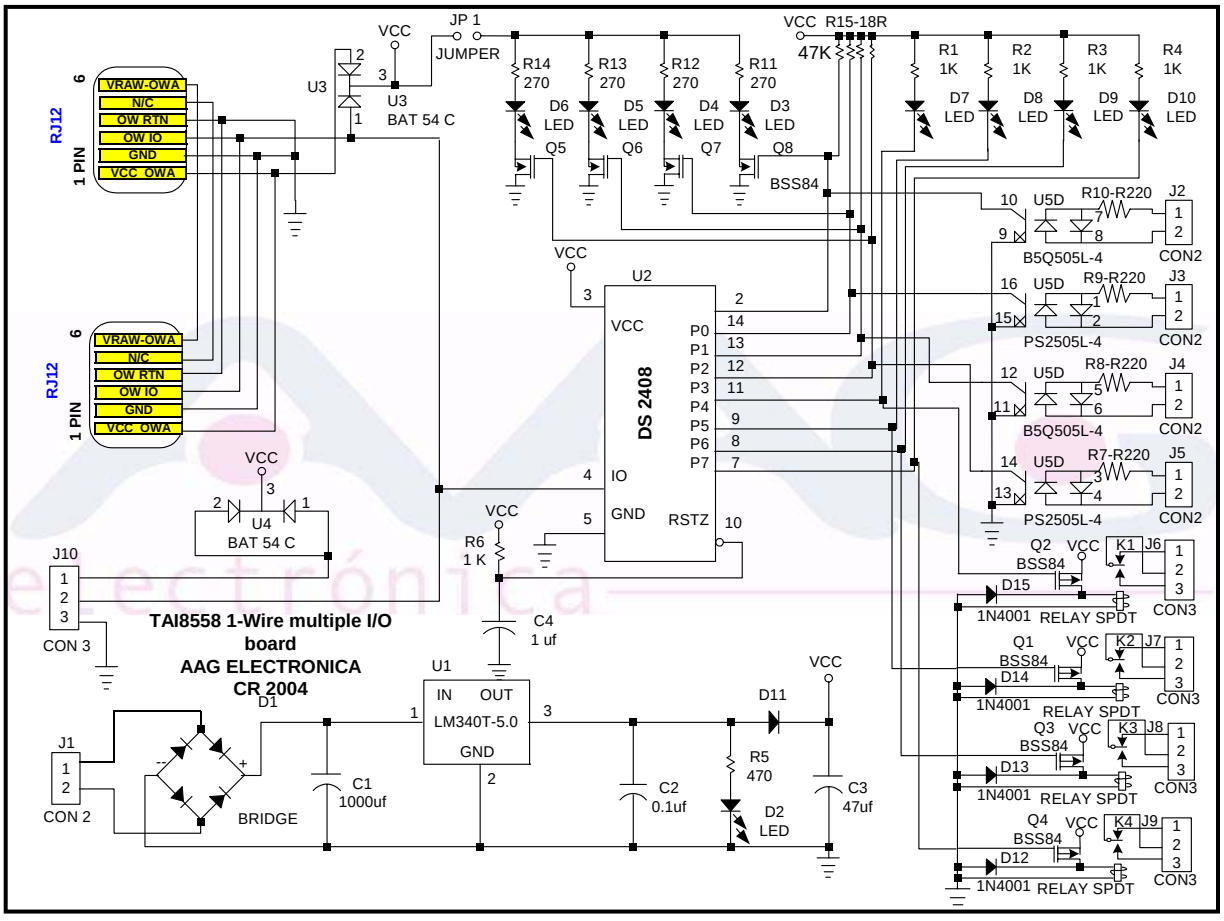
The AAG Electronica TAI8558 1-Wire® Multiple I/O Board is comprised of four (4) general purpose relays and four (4) associated Green LED indicators for the relay “on/off” states, as well as four (4) general purpose Red LEDs that indicate I/O activity on four (4) optically isolated “sense” inputs.

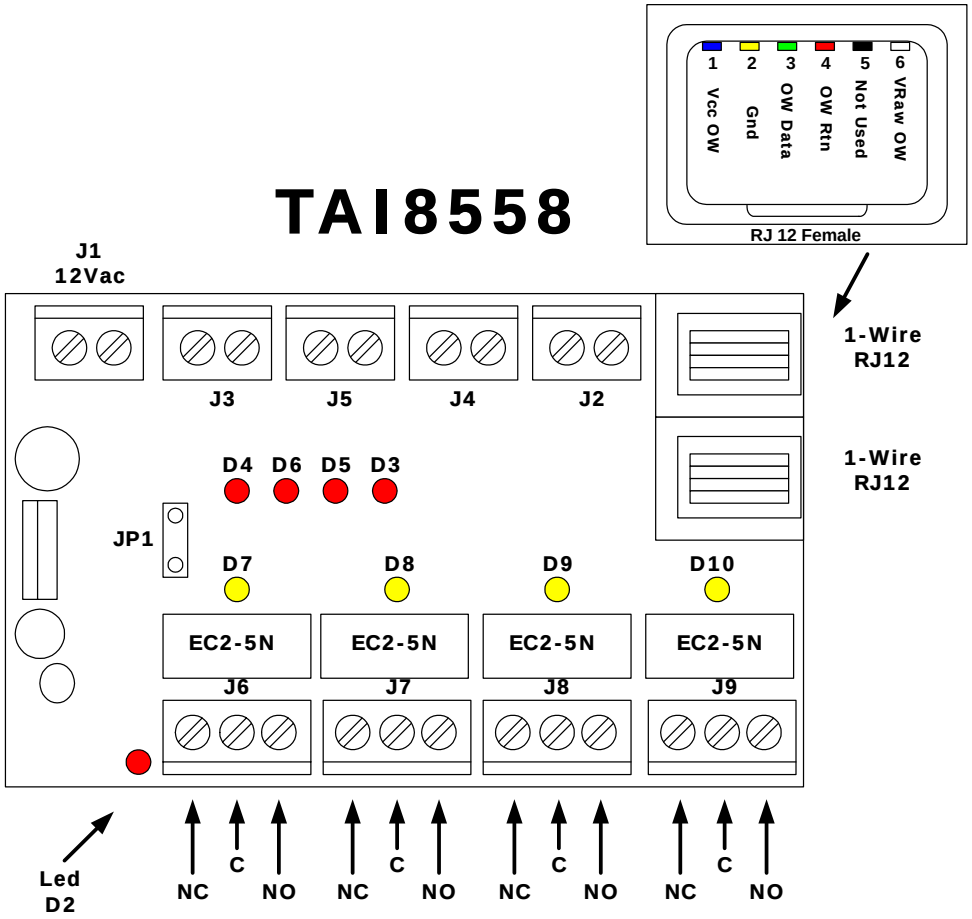
The 1-Wire® MicroLAN® network interface is based on the Dallas Semiconductor/MAXIM DS2408 1-Wire® 8-Channel Addressable Switch. The DS2408 is an 8-channel, programmable I/O 1-Wire® chip, on the AAG Electronica TAI8558 1-Wire® Multiple I/O Board. PIO outputs, P0 through P7 are configured as open-drain and provide an on resistance of 100 Ohms maximum. A robust PIO channel-access

communication protocol ensures that PIO output-setting changes, occur error-free.

A data-valid strobe output is used to latch PIO logic states into on-board circuitry for four (4) LED indicator on/off selection (as current "sink" outputs, logic low = 0 = On, logic high = 1 = Off), four (4) relay control on/off selection (also as current “sink” outputs, logic low = 0 = On, logic high = 1 = Off), and activity sense inputs for four (4) optically isolated inputs. For further information regarding the DS2406 or the TAG-ID standard, visit: www.ibutton.com or www.dalsemi.com

Schematic:





Connector Assignment:

Power Supply Input

Power input is provided to connector J1, pins 1 and 2 as either 9 VAC (12 VRMS AC), or +9 VDC to +12 VDC non-polarized.

Connectors J2, J3, J4 and J5 - Optically Isolated Inputs (Four (4).

Pins 1 and 2 - Provides for either AC or DC voltage (or digital signal) input. Isolated for a minimum of 2.5kilo-volts RMS breakdown, with a HIGH CURRENT TRANSFER RATIO (CTR): 300% typical, HIGH SPEED SWITCHING tr = 3 µs, tf = 5 µs typical, allowing for a minimum-sensed PIO pulse width (tPWMIN) of 10 µs typical (as a function of the Vcc power supply voltage). The instantaneous input transfer rate therefore is typically 100 KHz., for a single pulse to be sampled. Vcc is a common datasheet name for +5 VDC power lines with 1-Wire® devices.

NOTES: The maximum forward current (If) for the optically isolated diode inputs is 80 mA. The maximum voltage on any input is approximately 13 VAC (18 VAC RMS) or +/- 13 VDC (any polarity). The power dissipation (PD, at 25 degrees) maximum is 120 mWatts (0.1 W).

Open-collector TTL compatible buffer drivers should be utilized when translating TTL and/or CMOS logic levels, to provide sufficient drive from 74LSxxx-type (Schottky) or 74HCxxx and 4000 Series low-power type logic devices.

Connectors J6, J7, J8 and J9

Normally Open (NO) and Normally Closed (NC), and Common Relay Contact Inputs (Four (4) Form C Non-Latching NEC EC2-5NJ relays (one set of contacts for each relay), that complies with 2500 V surge-voltage requirement of the Telcordia (Bellcore) specification. The contacts are rated for a maximum voltage of 250 VAC or 220 VDC, at 2 Amperes (A maximum switching power of 60 Watts, 125 VAC). The Operate and Release Time (Excluding Bounce) is approximately 2 mSeconds (.002 Seconds).

Voltage/Current loads may be determined, as follows:

30 Vdc, 2A (Resistive)
110 Vdc, 0.3A (Resistive)
125 Vdc, 0.5A (Resistive)

The nominal operating power per relay, is 140 mW (3 to 12 V), 200 mW (24 V).
The typical number of running operation (open/close) under load, is 50 Vdc, 0.1 A (resistive) 1 X 10^6 operations at 85°C, 2 Hz, or 10 Vdc, 10 mA (resistive) 1 X 10^6 operations at 85°C, 2 Hz.

Make sure that the contact load is within the specified range; otherwise, the life-time of the contacts will be shortened considerably. Note that the running performance described in this diocument is an example, and that it varies depending on parameters such as the type of load, switching frequency, driver circuit, and ambient temperature under the actual operating conditions.

If excessive vibration or shock is applied to the relay, it may malfunction and the contacts remain closed. Vibration or shock applied to the relay during operation may cause considerable damage to or wearing of the contacts.

NOTE: Vcc must ***NOT*** be allowed to drop below +3.75 VDC, for reliable contact closure. All relays will release on +0.5 Vcc (or less), when power is removed from the board.

Pin assignments for each connector, are as follows:

Pin-1 NC
Pin-2 C
Pin-3 NO

Relay LED activity indicators D7, D8, D9 and D10, corresponding to relays K1, K2, K3 and K4, and also corresponding to the DS2408 open-drain output for I/O P4, P5, P6 and P7 are "wired-or" to connectors J6, J7, J8 and J9 inputs.

Relays K1, K2, K3 and K4 connected to the DS2408, at power up, are in the "off" state, provided by a power-on-reset circuit to the RSTZ pin of the DS2408

J10 Auxiliary 1-Wire® MicroLAN® Interface and +5 VDC Power Connector.

Utilized for 3 Conductor Cable I/O.

NOTE: This interface, is ***NOT RECOMMENDED*** for long cable lengths! However, due to cost considerations it is often desirable to include this power line and with reasonable care it is possible to use other wires in a cable that carries the 1-Wire® MicroLAN® network successfully, along with power.
This is never the ideal situation, since 1-Wire® MicroLAN® networks were not designed from the beginning for this, and thus suffers from potential signal noise problems due to

induced signals on its lines, from other conductors within the cable.

Pin assignments for each connector, are as follows:

Pin-1 – +5 VDC (Regulated) provided from a power supply output. The design goal of the 1-Wire® MicroLAN® standard for this pin, was to provide regulated power for 1-Wire® devices. Typical uses would be to power 1-Wire® devices such as the DS18B20 temperature sensor, which can benefit from using external power instead of parasitic power.

Pin-2 – OW_IO – 1-Wire® (One Wire) Input/Output, to/from a 1-Wire® Master.

Pin 3 - OW_RTN – 1-Wire® (One Wire) Power Supply and Ground Return, to/from a 1-Wire® Master and Power Supply. Though this line is often at ground levels it should ***NOT*** be confused with a true ground in that it may or may not be tied to a true ground level.

RJ12-1 and RJ12-2 1-Wire® MicroLAN® Interface Connectors (Two (2) I/Os).

RJ12-1 and RJ12-2 are the Dallas Semiconductor/MAXIM 1-Wire® MicroLAN® I/O interface to the DS2408 1-Wire® 8-Channel Addressable Switch. Either connector may be accessed by a 1-Wire® "Master", such as a DS9097U (or LINK) 1-Wire® Serial Port Adapter, with the other connector available to "daisy-chain" to additional 1-Wire® compatible devices and AAG Electronica
1-Wire® TAIxxxx Modules. BAT54 Schottky diodes protect the 1-Wire® MicroLAN® interface between the master and the board, from transient voltage over-shoot.

The connector type is a 6-pin modular connector known as a RJ-12 connector. It is often called a RJ-11 connector but a RJ-11 connector actually only has the inner 4 pins installed not 6 as in the RJ-12. So it really is an RJ-12 device (both uses the 6-pin modular connector housing) if fully implemented with all 6 wires.

Pin assignments for each connector, are as follows:

Pin-1 – VCC_OWA (+5 VDC and may be externally sourced in to the TAI8558 1-Wire® Multiple I/O Board, when power is ***NOT*** provided on the J1 – Power Supply Input connector, or ***NOT*** connected to an external VAC source, when an alternate VAC or

+VDC source is provided on J1 – Power Supply Input connector.

- Pin-2 - Power Ground/Logic Ground Return. Note, that both power lines use pin-2 as their power return or ground reference.

- Pin-3 - OW_IO – 1-Wire® (One Wire) Input/Output, to/from a 1-Wire® Master.

- Pin-4 - OW_RTN – 1-Wire® (One Wire) Power Supply and Ground Return, to/from a 1-Wire® Master.

- Pin-5 N/C – No Connection (default). This line is normally not used in 1-Wire® MicroLAN® networks and is to be left unconnected by default. It is sometimes very convenient to be able to monitor a slowly changing voltage level from some non 1-Wire® device through the same cable carrying 1-Wire® I/O information. This line is designated to that purpose. The voltage should be between 0 and +5 VDC and must be a very slow changing line (to minimize 1-Wire® data interface and allow time for error recovery). A suggested maximum change rate would be in the order of <10 kHz. And more preferably a steady DC level. This signal is rarely passed from one 1-Wire® device to another and normally terminates at the first 1-Wire® device (or module) encountered in the MicroLAN® network. Generally a low pass filter is also connected to this line when used as analog voltage monitor.

- Pin-6 – VRAW_OWA (Typically a maximum of +12 VDC (regulated)), but may be an unspecified unregulated voltage.

AAG Electronica, suggests a specifications of power to limit voltages to +5VDC at 50ma and +12 VDC at 200ma. Also, a suggested maximum cable length for using power through the cable using the +12VDC power at 250 feet, and a suggested maximum cable length for using power through the cable using the +5VDC power at 1,000 feet.

In particular, watch out for the voltage drop due to cable resistance in long cables. When you try to run power through a cable you have to deal with potential power losses generated by the length of the cable (among many other issues). You may need to consider DC to DC converters on the ends of the cable to insure that you have enough voltage/current to supply your board or additional “daisy-chained” 1-Wire® devices.

Jumper Connections:

JP1 Isolates and\or disconnects the on-board Vcc from LED activity indicators D3, D4, D5 and D6, to minimize the power consumption (if “relay status” (On/Off) is not needed).

General Purpose LED Activity Indicators:

LED activity indicators D3, D4, D5 and D6, corresponding to either the DS2408 open-drain output for I/O P0, P1, P2 and P3 or “wired-or” connectors J2, J3, J4 and J5 optically isolated inputs. NOTES: Jumper JP1 must be installed for the LED to illuminate, and a source of Vcc is supplied for power to the board. The drive for the LEDS from the DS2408 at power up, are in the "off" state, provided by a power-on-reset circuit to the RSTZ pin of the DS2408.

General Notes and Synopsis:

AAG Electronica’s design for a reasonable, complex 1-Wire® MicroLAN® compatible system network is based around the usage of numerous 1-Wire® hubs (the TAI8595 6 Channel 1-Wire® HUB). Each is capable of utilizing a switchable “wall-wart type power supply for several network branch, with each branch containing a few of devices/boards and or sensors.

This achieves two goals; (1) it keeps the maximum individual cable distances to a minimum by separately powering each branch. And (2), since we have fewer boards potentially on each leg it lowers the total needed drive current per section. With current requirements of 20 – 100 mA., for a board and the cable distance of about 250 feet maximum being supplied with power through the cable, we could handle 4 to 8 powered boards at 25 –50 mA., each. The advantages of such a MicroLAN® network would be easy connection of devices and sensors. Besides being easier to design for and switch, it produces less ‘noise” or cross talk onto the 1-Wire® MicroLAN® network signals, plus being able to supply possibly 8 hub branches at 12 volts 200ma each (8 * 200ma = 1,600 mA., from a central supply (and is still not a large power supply problem), where as 48 volts at 500 mA., or 4 Amperes is going to be more costly on a per board basis). It also makes power switching easier to implement. So all branches do not have to be powered on at any given time so redundant branches could be designed into a system and only switched on when needed. The AAG Electronica TAI8555 1-Wire® Switch module, allows control of loads up to 1 ampere.

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1-Wire® Multiple I/O module

TAI8558

The TAI8530 1-Wire® Power Supply Power Supply module is a low cost device of easy installation that allows the feeding of a series of devices that are connected to the output of the module through the network itself. The power lines of input and output voltage are disconnected which allows the isolation of the different spans installed. It contains a DS2406 that besides of holding the files of TAG-ID personality, it shows if the circuit has external feeding from the transformer (or not), through the DS2406 PIO-B (i.e., voltage presence sensing). It also shows the operation of the system through a red LED (+5 VDC) and a green LED (+12 VDC).

It only requires an external adapter of 12 VAC or +12 VDC (regulated or un-regulated, and polarize or non-polarized), as a switchable "wall-wart type power supply.

The DS2406 device fulfills the Dallas Semiconductor/MAXIM TAG-ID standard in such a way that under its inclusion in a 1-Wire® MicroLAN® network, the main computer (1-Wire® Master) can locate the DS2406 device and know all the data related to it, and attached associated 1-Wire® devices.

In order to locate the physical position in the network, the serial number can be seen on a label on the outside of the unit, so its physical position in the network can be located visually.

The module is protected through a quick-acting fuse of 12 volts @ 750 mA.

This module provides two standard RJ12 connectors 1-Wire® , allowing for continued "daisy-chaining" to additional TAIxxxx Modules.

Refer to: http://www.aagelectronica.com for additional AAG Electronica TAI 1-Wire® MicroLAN® compatible modules.

Important

Disclaimer:

This product is not designed, intended or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of a product of could create a situation where personal injury or death may occur. AAG does not assume any liability for usage of this product in: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support), or life support systems or medical equipment for life support, aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, etc.

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