

5411 Digital Output Module

Installation, Operation and Maintenance
Setup Manual

5/19/2011



The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed. Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate.

CAUTION

CAUTION used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage..

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved.

BEFORE YOU BEGIN

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

 **CAUTION****EQUIPMENT OPERATION HAZARD**

Verify that all installation and set up procedures have been completed.

Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.

Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in injury or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove ground from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

About The Book

At a Glance

Document Scope

This manual describes the operation and maintenance of the 5411 MOSFET Digital Output module.

Validity Notes

This document is valid for all versions of the 5411 MOSFET Digital Output module.

Product Related Information

 WARNING
UNINTENDED EQUIPMENT OPERATION
The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter and apply this product.
Follow all local and national safety codes and standards.
Failure to follow these instructions can result in death, serious injury or equipment damage.

User Comments

We welcome your comments about this document. You can reach us by e-mail at technicalsupport@controlmicrosystems.com.

Overview

The Model 5411 Digital Output module adds 32 MOSFET outputs to a 5000 input/output system. Up to 16 Model 5411 modules may be installed on the I/O bus, for a total of 512 discrete outputs per bus. These outputs control panel lamps, relays, solenoid valves, and other on/off devices that require 12 to 24Vdc at moderate load currents of up to 1A.

The MOSFET digital outputs are optically isolated from the logic power in two groups of 16. To simplify field wiring, the outputs are grouped with a common return. Counter emf protection diodes across the loads allow operation with inductive loads.

32 LED indicators on the Model 5411 show the status of each of the outputs. The SCADAPack controller module enables or disables the LED's to control power consumption in solar powered or unattended applications.

Installation

The installation of the 5411 module requires mounting the module on the 7.5mm by 35mm DIN rail and connecting the module to the system I/O Bus. Refer to the System Configuration Guide, at the beginning of this manual, for complete information on system layout, I/O Bus cable routing and module installation.

For ATEX and IECx applications only:

This equipment is to be installed in an enclosure certified for use, providing a degree of protection of IP54 or better. The free internal volume of the enclosure must be dimensioned in order to keep the temperature rating. A T4 rating is acceptable.

Field Wiring

The 5411 module provides 32 DC outputs. The outputs are sinking MOSFETs. The loads are connected between a 12 to 24Vdc power source and the digital outputs. The outputs are divided into two groups of 16. Each group of 16 loads shares a common power source. This is the same power source that will provide power to the 5411 module. See **Figure 1: Typical Field Wiring Digital Outputs 0-15** and **Figure 2: Typical Field Wiring Digital Outputs 16-31**. Controller, modem and I/O modules use screw termination style connectors for termination of field wiring. They accommodate solid or stranded wires from 22 to 12 AWG.

The connectors are removable. This allows module replacement without disturbing the field wiring. Leave enough slack in the wiring for the connector to be removed.

Remove power before servicing unit.

To remove the connector:

- Pull the connector upward from the board. Apply even pressure to both ends of the connector.

To install the connector:

- Line up the pins on the module with the holes in the connector.
- Push the connector onto the pins. Apply even pressure to both ends of the connector.

Digital Outputs

Refer to **Figure 1: Typical Field Wiring Digital Outputs 0-15** and **Figure 2: Typical Field Wiring Digital Outputs 16-31** for Digital Output wiring examples.

The following conditions apply when using these digital outputs:

- The outputs are for DC loads only. AC loads can be controlled using Control Microsystems Models 5401, 5402, 5406, 5407 and 5408 modules. The 5411 module can be used to drive mechanical and solid state relays, which in turn can drive AC loads.
- DC power is applied to P3 when using outputs 0-15 on connectors P3 and P4.
- DC power is applied to P5 when using outputs 16-31 on connectors P5 and P6.
- The necessity for fusing the loads should be determined by the application. The 5411 module does not require fusing.
- Loads are connected from the digital output to the user's power supply. Multiple power supplies can be used as long as the user does not require the built in EMF suppression diodes and the voltage of the loads is kept below the voltage on the DC power terminals.
- Inductive loads require EMF suppression diodes. There are suppression diodes built into the 5411. For these diodes to be effective the inductive loads are connected to the DC power terminal on the 5411 module as shown in **Figure 1: Typical Field Wiring Digital Outputs 0-15** and **Figure 2: Typical Field Wiring Digital Outputs 16-31**.

If the application has inductive loads and multiple power supplies are used then external EMF suppression diodes or other forms of transient protection need to be installed by the user.

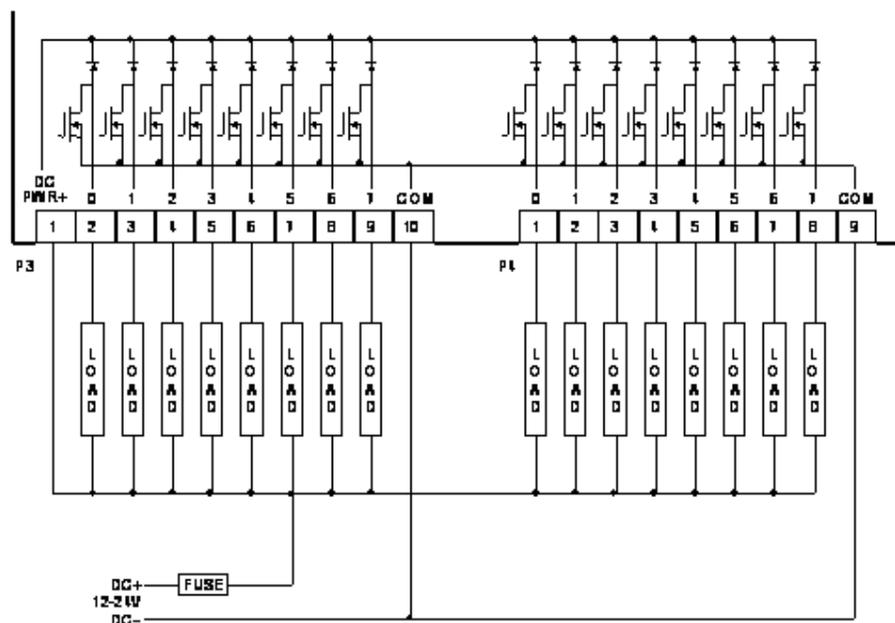


Figure 1: Typical Field Wiring Digital Outputs 0-15

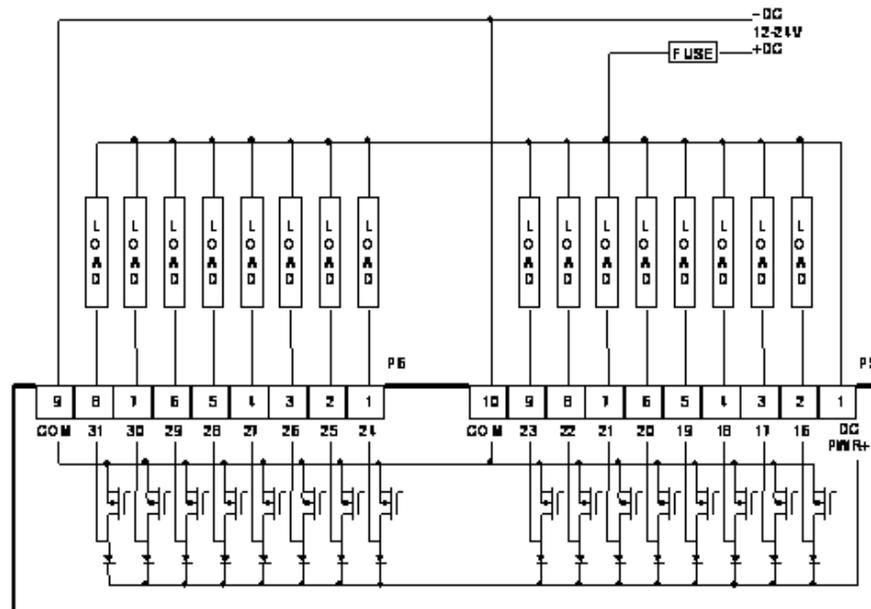


Figure 2: Typical Field Wiring Digital Outputs 16-31

Address Selection

The 5000 I/O bus will support a maximum of twenty I/O (input/output) modules. 5000 I/O module types may be combined in any manner to the maximum supported by the controller used. The types of input and output modules available are:

- Digital Input modules
- Digital Output modules
- Analog Input modules
- Analog Output modules
- Counter Input modules

Each type of I/O module, connected to the I/O bus, has a unique I/O module address. Different types of I/O modules may have the same module address.

The address range supported by the controller module may restrict the I/O module address range. Refer to the controller manual for the maximum address supported.

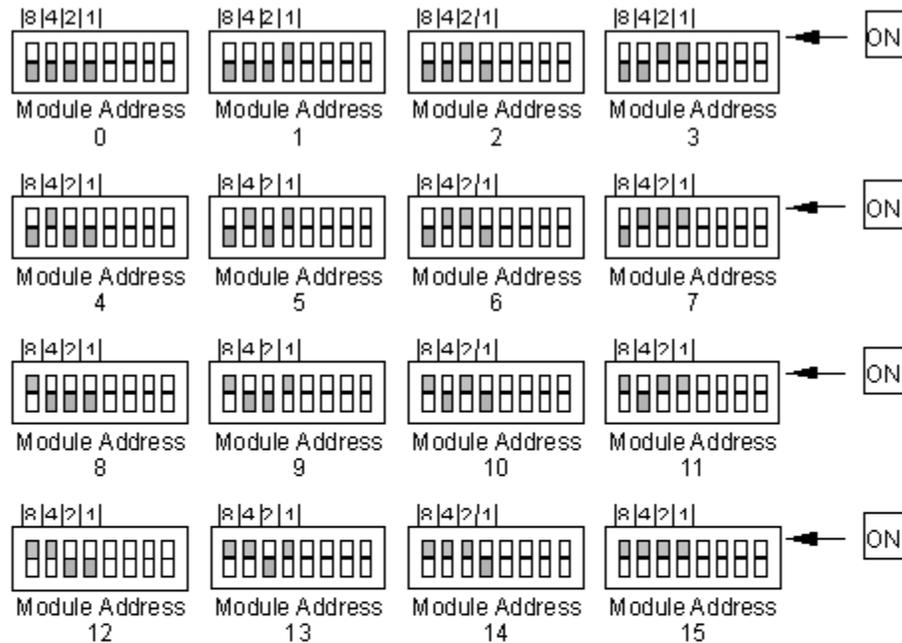
The four address switches labeled 8, 4, 2, and 1 set the address.

To set the address:

- Open the four switches by sliding the actuators to the “OFF” position.

- Close the switches that total to the desired address by sliding the actuators to “ON”.

Switch settings for each of the 16 module addresses are shown in **Figure 3: 5411 Digital Output Module Address Switches**.



How to Set Address Switches

- Determine the module address.
- Slide actuators (side shown in gray).

ON

Add switch value →

Slide to this side to ignore switch value

Figure 3: 5411 Digital Output Module Address Switches

Operation and Maintenance

This module requires no routine maintenance or calibration. If the module is not functioning correctly, contact Control Microsystems Technical Support for more information and instructions for returning the module for repair.

LED Indicators

The Model 5411 Digital Output module has one red status LED per digital output. This LED is on when the corresponding output is turned on. See **Figure 4: LED's** for the positions of the 32 LED's.

The SCADAPack controller module, through the I/O bus, powers the LED's. The LED's can be disabled to conserve power. Refer to the controller manual for more information.

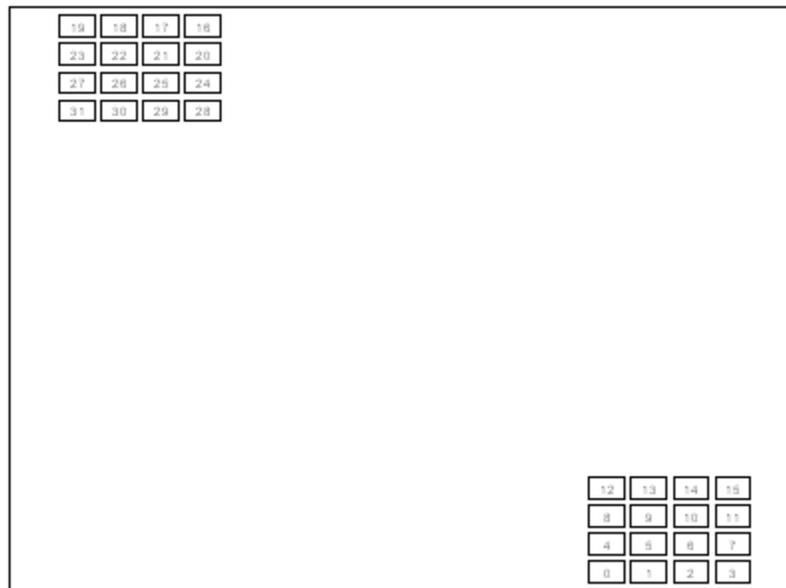


Figure 4: LED's

Troubleshooting

Condition	Action
Output LED does not come on when output is turned on	Check the LED power from the controller module.
Output LED comes on but the output is not energized.	Check the DC power. Check wiring on DC power terminals. Check that power is applied to both of the groups of 16

	if both groups are used.
Output LED comes on and output is energized, but the field device is not activated.	Check the field wiring. Check the field device.

Specifications

Disclaimer: Control Microsystems reserves the right to change product specifications. For more information visit www.controlmicrosystems.com.

General

I/O Terminations	Two 9 and two 10 pole, removable terminal blocks 22 to 12 AWG 15A contacts Screw termination - 6 lb.-in. (0.68 Nm) torque
Dimensions	5.65 inch (144mm) wide 5.00 inch (127 mm) high 1.80 inch (45mm) deep
Packaging	Corrosion resistant zinc plated steel with black enamel paint
Environment	5% RH to 95% RH, non-condensing -40°C to 70°C -40°F to 158°F
Addressing	Configurable with 4 DIP switches
Visual Indicators	32 Red LED's Can be disabled to conserve power

Power Requirements

5V	5V at 150mA with all LED's and outputs turned on 5V at 40mA with all LED's off and all outputs turned on
12-24V	24V at 5mA with all outputs ON 8V min., 30V max. UL508 rated 13.75-28Vdc Class 2.

Digital Outputs

I/O points	32 points
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Output Rating	1.0A maximum 0.35V maximum drop at 1.0A 0.05V maximum drop at 0.1A Open drain sinking when ON Maximum voltage when OFF must not exceed the DC power applied to the isolated group
Transient Protection	2.5kV surge withstand capability as per ANSI/IEEE C37.90.1-1989 Inductive load protection diodes included
Isolation	Isolated in two groups of 16 Outputs 0-15 in one group on the bottom edge Outputs 16-31 in one group on the top edge Isolation 500Vac/dc from chassis and logic ground

Approvals and Certifications

Hazardous Locations - North America	<p>Suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations. Temperature Code T4</p> <p>UL Listed and CSA certified to the following standards:</p> <ul style="list-style-type: none"> • CSA Std. C22.2 No. 213-M1987 - Hazardous Locations. • UL Std. No. 1604 - Hazardous (Classified) Locations.
Hazardous Locations - Europe	<p>ATEX II 3G, Ex nA IIC T4</p> <p>per EN 60079-15, protection type n (Zone 2)</p>
Hazardous Locations	<p>IECEX, Ex nA IIC T4</p> <p>per IEC 60079-15, protection type n (Zone 2)</p>
ATEX and IECEX Applications only	<p>This equipment is to be installed in an enclosure certified for use, providing a degree of protection of IP54 or better. The free internal volume of the enclosure must be dimensioned in order to keep the temperature rating. A T4 rating is acceptable.</p> <p>For products using Solid State Relays (5415, 5606 and 5607 modules and SCADAPack using 5606 and 5607 modules) A T4 rating is acceptable for maximum loads of 2A. When 3A loads are connected to the Solid State Relays, the maximum ambient rating is lowered to 50°C in order to maintain the T4 rating.</p>
Safety	<p>CSA (cCSAus) certified to the requirements of: CSA C22.2 No. 142-M1987 and UL508. (Process Control Equipment, Industrial Control Equipment)</p> <p>UL (cULus) listed: UL508 (Industrial Control Equipment)</p>
Digital Emissions	<p>FCC 47 Part 15, Subpart B, Class A Verification</p> <p>EN61000-6-4: 2007 Electromagnetic Compatibility Generic Emission Standard Part2: Industrial Environment C-Tick compliance. Registration number N15744.</p>
Immunity	<p>EN61000-6-2: 2005 Electromagnetic Compatibility Generic Standards Immunity for Industrial Environments</p>
Declaration	<p>This product conforms to the above Emissions and Immunity Standards and therefore conforms with the requirements of Council Directive 2004/108/EEC (as amended) relating to electromagnetic compatibility and is eligible to bear the CE mark.</p> <p>The Low Voltage Directive is not applicable to this product.</p>

