Introduction

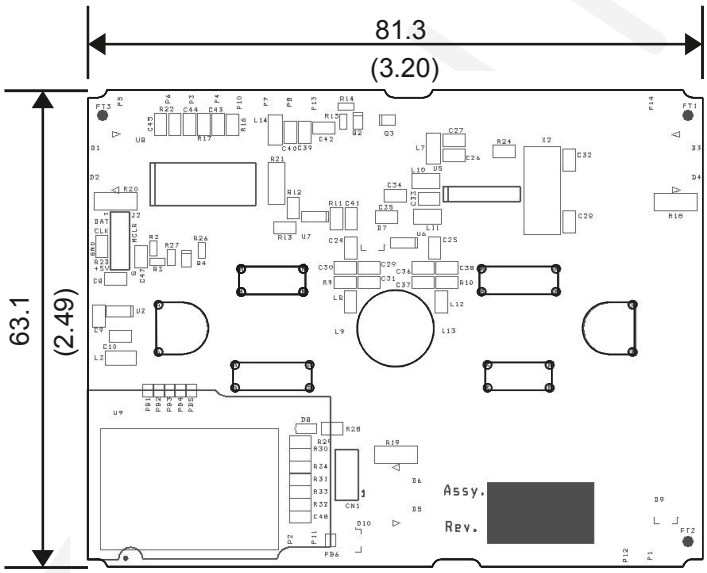
This document is a user guide for the 3065-3 outlet control board assembly.

Description

The 3065-3 circuit board assembly is a general purpose main control board for smart outlets manufactured by OFI, Inc. Assembly no. 3065 incorporates an ISO14443B RFID reader.

Note: The 3065-3 may optionally mount a daughterboard containing a co-located third-party FCC/IC certified radio network module subject to a maximum output specification (see below).

Dimensions & Markings



Tuning

The 3065-3 has no tunable components and no tuning requirements.

Connections

Pad	Signal
P1	Relay 2 Drive Out (open collector drive)
P2	Relay 2 Drive Out (open collector drive)
P3	Current Sense 2 Analog Input (0-5V)
P4	Current Sense 1 Analog Input (0-5V)
P5	No connection
P6	Voltage Sense 1 Analog Input (0-5V)
P7	Regulated 5Vdc input

Pad	Signal
P8	DC common
P9	No connection
P10	Analog Test Signal Output (5V TTL)
P11	Relay 12V Out
P12	Relay 12V Out
P13	12Vdc input
P14	No connection

Connections for optional radio network module daughterboard

Pad	Signal
PB1	Regulated 3.3Vdc output
PB2	DC common
PB3	UART Tx output
PB4	UART Rx input
PB5	Reset out
PB6	DC common

Agency Certifications

FCC 15.225, FCC 15B, Canada RSS-210 Limited Modular Approval (pending)

FCC ID: S9C-3065-3
IC: 5850A-3065V3

This equipment has been tested and found to comply with the limits for a Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications not expressly approved by OFI, Inc. could void the user's authority to operate the equipment

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been designed to operate only with the integral antennas. External antennas and modification to the included integral antenna are strictly prohibited for use with this device.

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions: (1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage; et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Application Limitations

The 3065-3 Control Board (module) shall be sold only as a component of products designed by or for OFI, Inc.:

- with the antennas integral to the 3065-3 module,
- that provide the 3065-3 module with a regulated 5V power supply compliant with the Recommended Operating Conditions,
- such that, under normal use, the radiating structure(s) of the device is/are not within 20 centimeters of the body of the user,
- such that any choice of the optional FCC/IC certified radio network module adheres to the appropriate specified maximum output ratings (see Ratings section below)
- subject to further FCC part 15B and ICES-003 unintentional radiator testing (in particular, in the case of any new daughterboard PCB containing the optional radio module)
- subject to any other applicable FCC or Industry Canada testing

Products incorporating the 3065-3 Control Board shall bear the marking:

Contains/Contient FCC ID: S9C-3065-3, IC: 5850A-3065V3

Ratings

Absolute Maximum Ratings

Description	Min	Typ	Max	Units
Logic Supply	-0.3		6.5	Vdc
Relay Drive Supply	-0.3		16	Vdc
Temperature	-40		125	ºC

Exceeding the maximum ratings may result in permanent damage.

Recommended Operating Conditions

Description	Min	Typ	Max	Units
Logic Supply	4.75	5	5.25	Vdc
Relay Drive Supply	11	12	13	Vdc
Temperature	-40		80	ºC
Logic Supply Current			100	mA
Relay Drive Current			70	mA

ISO14443B Reader (@ 25°C, VCC = 5.0V)

Description	Min	Typ	Max	Units
Read Range	8		16	mm
Read range specified for RightPlug compliant encoded plugs				
Field Strength (10 m)			29.5	dBuV/m

Optional co-located radio network module

Description	Min	Typ	Max	Units
Permissible MPE ratio (see Appendix A):				
FCC and IC			< 1.0	

See Appendix B for a sample 2.4 GHz ZigBee module that meets this requirement.

Appendix A: Determination of Maximum MPE of optional co-located radio module

The field strength of the RFID reader is 29.5 dBuV/m at 10 m, which gives an EIRP of 2.97e-6 mW. At a distance of 20 cm, this gives a power density of 5.91e-10 mW/cm^2.

For the RFID reader, the FCC MPE (uncontrolled) is 180/13.56^2 = 0.979 mW/cm^2. Thus for FCC the MPE ratio at 20 cm (uncontrolled) is 5.91e-10 / 0.979 = 6.04e-10.

For the RFID reader, the IC power density limit (uncontrolled) is 0.2 mW/cm^2. Thus for IC the MPE-like ratio (as that of the FCC) at 20 cm (uncontrolled) is 5.91e-10 / 0.2 = 2.96e-9.

For RF exposure, in order to meet the requirements for simultaneous test exclusion for the RFID reader of the 3065-3 module and the co-located radio module, the sum of their MPE ratios must be <= 1.0 (FCC OET 447498 D01 v06 sec. 7.2). For either FCC or IC the MPE ratio of the RFID reader is small enough that this requirement is met by simply allowing the MPE ratio of the co-located radio module to be resolvably < 1.0 to any reasonable number of figures.

Appendix B: Sample 2.4 GHz ZigBee module for co-location

For the ZICM3588SP0-1 from CEL (FCC ID: W7Z-ZICM357SP0, IC: 8254A-ZICM357SP0), the OET grantee exhibit "RF Exposure Info" for this FCC ID gives the evaluation frequency 2440 MHz and maximum EIRP of 9.14 dBm (8.21 dBm conducted power plus 0.93 dBi antenna gain). The latter corresponds to an EIRP of 8.20 mW which at 20 cm has a power density of 0.00163 mW/cm^2.

For FCC, the power density MPE at 20 cm (uncontrolled) for 2440 MHz is 1.0 mW/cm^2 (47 CFR 1.1310). Thus for this module the MPE ratio is 0.00163/1.0 = 0.00163 (uncontrolled). Since this value is < 1. 0 (see Appendix A above) this module meets the FCC requirements for co-location in an uncontrolled environment.

For IC, the power density Field Strength Limit at 20 cm (uncontrolled) for 2440 MHz is 0.002619*2440^0.6834 = 0.541 mW/cm^2 (RSS-102 Table 4). Thus for this module the MPE-like ratio (as that of the FCC) is 0.00163/0.541 = 0.00302 (uncontrolled). Since this value is < 1. 0 (see Appendix A above) this module meets the IC requirements for co-location in an uncontrolled environment.