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TECHNICAL BULLETIN TB-153

IFC 211 POWER REQUIREMENTS FOR HIGH CURRENT LOADS SUCH AS INCANDESCENT LAMPS

The StacoSwitch interface controller (IFC) is an embedded microcontroller based product designed to manage clusters of lighted push button switches and indicators. The IFC communicates with the host computer via standard serial interface and provides information on switch closures, sensor action or other digital transactions. The IFC directs the output from the host computer to manage incandescent or LED -based indicators or push button switches.

The primary hardware of the IFC is composed of a Microcontroller Board and the Decoder/Driver Board. Power requirements for standard low current load (e.g.; LED) configuration are described below. In this configuration a single power supply may be used for this type of application.

Microcontroller Logic power required: + 5VDC ± 10 % at 150 milliamperes (maximum)

Decoder/Driver Board:
Load power capacity maximum: + 5VDC ± 10 % at 122milliampers (sinking, steady state) per channel, over 0° C to 70°C.

If the IFC is required to direct the output of a host computer to manage high current loads such as incandescent lamps, then two separate power supplies are recommended for IFC operation. When an incandescent lamp is energized, there is an in-rush current. The lamp in rush current is due to the low resistance of the cold lamp filament. The filament color temperature (Kelvin) at which the lamp is designed to operate, determines the magnitude of the in- rush current. Typically the in-rush current will be 8-12 times the rated current when full rated + 5 VDC is applied. The current "fall time", or the amount of time it takes the current to stabilize at its rated value is from 30 to 100 milliseconds. For example, the rated current of an incandescent lamp, (reference Oshino P/N OL-718) is 115 milliamperes. The laboratory measurement indicated that the in-rush current of the same device in actual application, after a few micro seconds of switch on time was 680 milliamperes. The in-rush current gradually decayed to the steady state rating current of 115 milliamperes.

Therefore, if the IFC is required to manage a cluster of 36 high current Oshino lamps, the total in-rush current of the IFC load will be 24.5 amperes. Thus the above single source power supply will not have the capability to deliver adequate power demanded by the IFC in-rush load current.

Use the following procedural steps in selecting a power supply to manage high in-rush current incandescent lamps or similar high in-rush current loads:

(1) Calculate the worst case, steady state load current as stated herein. Multiply the rated worst case steady current by a factor of 1.25 and designate it I'. The selected power supply must be capable of supplying at minimum a load current equal to I'.

(2) Prevent power supply load in-rush current damage by requiring a current limiting protection feature in the selected power supply.

(3) The power supply must be regulated within the load power guidelines, described above.

Note that for illustration purposes, the IFC power supply connection diagram (reference: Figure 1) is provided for lighting a cluster of 36 incandescent lamps . The load power supply for this application is rated at + 5 VDC ± 10% at 15 amperes. The load power supply rated current may have different values for other high current loads.

(4) Select an appropriate power source for the Microcontroller Logic Board.

(5) Fabricate high current supply cables and verify their pin-to-pin continuities.

(6) Assure that both power supplies switches are at the "OFF" positions.

(7) Verify the operation of push button matrix (if applicable) or any other load and re-verify that the load power supply is rated adequately.

(8) Assemble the stack-up of the push button matrix or the load, with the Termination Board and the Decoder/Driver Board, as shown in Figure 1.

(9) Connect the IFC and the high current load connection as shown in Figure 1.

(10) Activate the host computer and then insert the IFC program floppy disk in the floppy disk drive.

(11) Turn both supplies "ON".

(12 Execute the IFC program, by sending the following command to the IFC: 7,0,255 (Now all loads are ON)

(13) Verify the operation of the IFC and its high current load, for example, by observing the illumination of all lighted push buttons.

(14) Command the IFC to terminate the load activation by sending the following command to the IFC: 7,0,0.

(15) Turn both power supplies switches to "OFF" positions.

(16) Disassemble the connected boards if applicable.

Note: If the application requires the use of an "IFC Screw Terminal Board" in place of an "IFC Matrix Termination Board" make such substitution in the IFC board stack-up and continue performing the remaining steps as outlined above. All testing must be performed while using static elimination control procedures such as an electrostatic mat and appropriate wrist band.

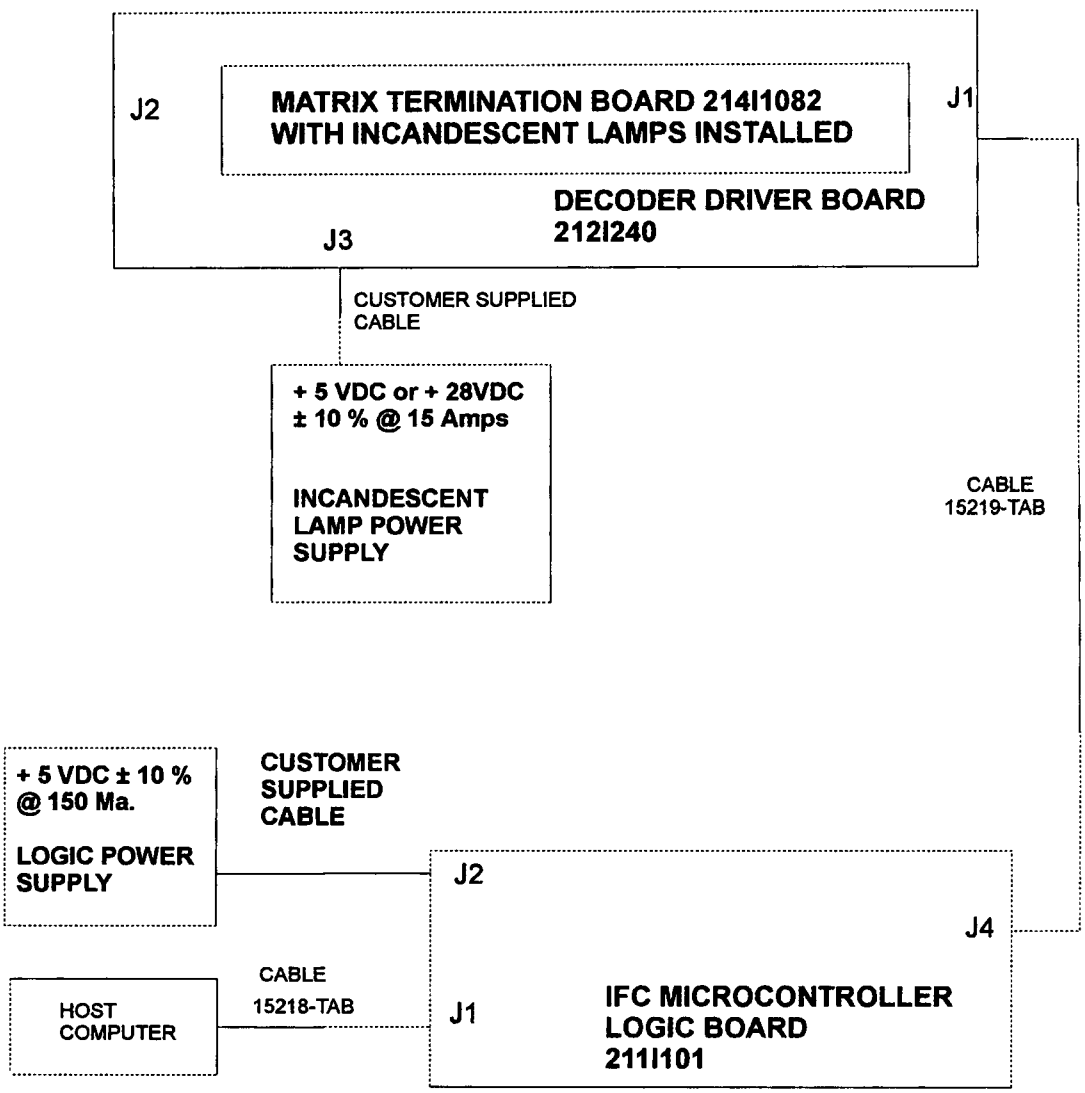

FIGURE 1 HIGH CURRENT INCANDESCENT LAMP PUSH BUTTON SWITCH/LOAD APPLICATION