The MIP737SE board allows managing switches pushbutton and LED annunciators for the Main Instrument panel of your B737NG simulator. The board has 48 digital outputs ready to drive LEDs, 59 digital input for switches / pushbutton and 2 encoder input. A complete list of input outputs is on the last pages of this manual.

Note: This manual contains the latest information at the time of drafting. Due to the continuous evolving of the product some features could be changed or modified. Eventual later informations can be found at CPflight website www.cpflight.com

IMPORTANT NOTE!
The MIP737SE board is an extension of the CPflight MCP hardware and requires CPflight MCP737, (IPRO or EL versions) to operate. The MIP737SE board is compatible with Project Magenta, PROSIM737, PMDG737NXG and the most common FS software; more informations about the compatibility at the web-site page: http://www.cpflight.com/sito/support/swcomptab.asp

The MIP737SE board is also compatible with the default FS aircraft, in this case the functioning is limited to the FS aircraft supported functions.

The connection of the MIP737SE board requires somewhat technical capability. You have to know how to connect a switch or a LED, to solder wires, to understand the drawings and schematic of this manual.

The board is provided as it is; switches, LEDs or other spare parts to put on your cockpit are not provided with the board; you may find all these parts on several online stores, CPflight is not organized to distribute spare parts, our aim is to provide a board to make these parts to works in conjunction with the MCP737 hardware.

It is very important that you know the functions that you need to implement in your cockpit and see on this manual if the board support and match your requirements. All the informations to connect the MIP737SE board are on this manual, the list on the last pages also give indications about where to use a steady or a momentary switch, a rotary selector, a pushbutton etc. There are no indications about model, dimension rating or shape for switches, you can use anything able to close a contact. Please do not email us with informations to connect the MIP737SE board are on this manual, the list on the last pages.

A and B) and the other side to the AUX socket on the back of the MCP737. If you have other modules (for example an EFIS selector, a NAV radio etc) you can connect them to the second socket and so on (daisy-chain).

The MIP737SE board contains delicate Integrated Circuit (IC) chips. To protect them against damage from static electricity, you should follow some precautions whenever you work on the board:

1. Always disconnect power supply before to work on the wiring.
2. Use grounded wrist strap before handling components and wires. If you do not have one, touch both of your hands to a safely grounded object or to a metal object, such as the power supply case of your PC to discharge possible electrostatic charges.
3. Pay attention to not cause short circuits on the board (for example with fragment of wires when working on the connections); keep the board clean and eventually the board from dust or chippings when working on other part of your cockpit.

LED’s

The digital outputs of the MIP737SE board are settled to drive high efficiency LED’s. The LED’s are multiplexed, so each group of LED’s has its own common pole; it is important to connect together common pole belonging to different groups (see below).

It is not relevant the sequence in the daisy-chain modules connection. Each module has two 5 pole plugs, one cable is connected to the previous module and the second plug allows connecting the successive one. The MCP only have a single 5 pole connector as it function as a Master and manage signals for all other modules.

WARNINGs:

- The use of MIP737SE board without suitable knowledge could lead to damage of the electronic circuit; warranty does not cover damages due to incorrect wiring of any device.
- Do not connect anything in a different way from how indicated in this manual.
- The MIP737SE board contains delicate Integrated Circuit (IC) chips. To protect them against damage from static electricity, you should follow some precautions whenever you work on connections:

1. Always disconnect power supply before to work on the wiring.
2. Use grounded wrist strap before handling components and wires. If you do not have one, touch both of your hands to a safely grounded object or to a metal object, such as the power supply case of your PC to discharge possible electrostatic charges.

WIRING

The MIP737SE board is equipped with screw terminal blocks. Terminals may accept wires from 0,1 to 1mm² section; don’t use large wires, 0,14 to 0,25mm² are more suitable.

The function defining each terminal block is given in the following pages of this document. Pay attention to the correct position of wires; errors in the connection may produce unpredictable behaviour in the functioning and also could lead to damage of the electronic circuit.

TP: Particular attention must be applied in the wire connection, do not set too long bare on wires to avoid short circuit between wires on the terminal blocks and reduce the wire length at least what is necessary.

Do not wire all the devices in a single operation. Wire some function (for example a single terminal group) and test them, when all is OK for these, continue with another group.

1. Digital Output

LED’s supported by each group (8) there are some exceptions. Groups are subdivided as follows:

Group A (terminals 1 to 10): Captain side glare-shield
Group B (terminals 11 to 20): Captain side Main Panel (excluding “STAB OUT OF TRIM” lamp)
Group C (terminals 21 to 40): Center Panel (+ “STAB OUT OF TRIM” lamp)
Group D (terminals 41 to 50): Copilot side Main Panel
Group E (terminals 51 to 60): Copilot side glare-shield

BOARD SUPPLY

The MIP737SE board is provided with a 6VDC power supply adapter. Although identical to power supply adapter provided with other CPflight products, dependently by the product, the adapter type and polarity can be different. Do not mix power adapter between different products. Warranty does not cover damages due to the use of unsuitable power supply adapter.

Fig. 1 Daisy-chain structure
To connect the LED you have to respect the polarity. The LED has an Anode (referred as “A” in the tables) and a Cathode (referred as “K” in the tables). To identify the polarity look on the terminals of the LED, the Anode pin is a little longer than the cathode. Also in the round LED’s, the Cathode pin is identified by a little flat area on the LED plastic body.

Each terminal block group has independent Anode for each single LED and a common pole to connect all Cathodes together. The common line dispose of two terminal block on the same pole (see figures on next pages); this allows to more easily connect the common group of wires subdividing in two smaller groups.

To test your connections during the assembling avoiding any doubt about the simulation software, use the “TesuCPFlightHardware” utility. The utility is installed together with the communication driver, downloadable at: http://www.cpflight.com/site/downloads/downloads.asp

DIGITAL INPUT

The board has 59 digital input and 2 encoder input for switches, rotary switches and pushbutton. The inputs are arranged in groups (see figure). Each group control a specific area with some exceptions as follow:

**Group A** (terminals 1 to 10):
- Captain side glare-shield
- Captain side Main Panel
- Captain side glare-shield

**Group B** (terminals 7 to 26):
- Captain side Main Panel (terminals 13 to 16 also attend to Copilot side)

**Group C** (terminals 27 to 54 and 61 to 66):
- Copilot side Main Panel
- Center Panel

**Group D** (terminals 70 to 80):
- Copilot side Main Panel

**Group E** (terminals 55 to 60):
- Copilot side glare-shield

Some of the MIP devices have pilot-light and button switch built in a single unit (for example the AP-AT/FMC disconnect warnings). You may build these assemblies in several ways, in the picture of Errore. L’origine riferimento non è stata trovata, you can see an assembly for this area using the “OMRON A165-CAM” and “OMRON A165L-AW” part codes.

The above draw shows how to connect LED’s and pushbutton for the Captain side glare-shield. Note that each LED anode “A” is wired to a single terminal block; all cathodes are wired together and connected to a common cathode terminal. There are two terminals dedicated to the common cathode, you can indifferently use one, the other or both, if you want to wire the LED cathode in two groups.

The glare pushbuttons allow the acknowledgment of warnings. Depending by the current alarm status the pushbutton action shut-down the warning, get steady a flashing light or extinguish a warning signal. Note that the 6 warning lamp indication plate also have pushbutton function. Pushing the button the warning extinguish while pushing again you recall the warning status again and the lamp will illuminate if the warning condition still persist. Functioning and topics in the warnings acknowledgment/recall is managed by the used simulation software.

The above draw shows how to connect LED’s and pushbutton for the Captain side glare-shield. Note that each LED anode “A” is wired to a single terminal block; all cathodes are wired together and connected to a common cathode terminal. There are two terminals dedicated to the common cathode, you can indifferently use one, the other or both, if you want to wire the LED cathode in two groups.

The glare pushbuttons allow the acknowledgment of warnings. Depending by the current alarm status the pushbutton action shut-down the warning, get steady a flashing light or extinguish a warning signal. Note that the 6 warning lamp indication plate also have pushbutton function. Pushing the button the warning extinguish while pushing again you recall the warning status again and the lamp will illuminate if the warning condition still persist. Functioning and topics in the warnings acknowledgment/recall is managed by the used simulation software.

**Note:** Due to the number of terminal block available for each group, the “STAB OUT OF TRIM” pilot-light terminal is located in the CENTER PANEL group.
In the multi-position switches (rotary or toggle) the unconnected position select the missed item of the related control. In detail the selected function for each control when positioned to the unconnected pole are:

N1 SET selector: "2"
FUEL FLOW 3 position switch: "RATE"
LANDING GEAR 3 position switch: "OFF"
AUTO BRAKE selector: "RTO"

The encoder have three pin (some have 5 pin as includes a push-on switch), the pins are "A", "B; and "C". Usually the center pin is the "C" that is the common pole and has to be connected to the Common pole terminal of the board, but depending by the model the common pin may be in other position; check on encoder datasheet that may be easily found on the manufacturer web-site. Once connected, if the encoder works with reverse action, simply swap the connection on the "A" and "B" terminals.

The above draw shows how to connect LED’s and switches for the Copilot Panel. Consider the same concepts of previous section for LED connection. Each driver group is arranged to drive 8 light. The captain panel requires 9 LED, so the "STAB OUT OF TRIM" light terminal is located in the Center panel group (terminal no. 23) also if related to the Captain panel. The related cathode should be wired to the Common Cathode 3 (terminal 21 or 22) together with other Center panel lights (see above draw).

The data about resolution, type and material of shaft, dimensions, torque etc. are not mandatory and depends on your preferences. The encoder type is one of most commonly available by several manufacturer, follow you find some indications for applicable encoders, but also any from other manufacturer having the above characteristics may be useful.

<table>
<thead>
<tr>
<th>MANUFACTURER</th>
<th>PART CODE</th>
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<tbody>
<tr>
<td>ALPS</td>
<td>EC11 series</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>EC16 series</td>
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<tr>
<td>BOURNS</td>
<td>3315 series</td>
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<td></td>
<td>ECW series</td>
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<tr>
<td></td>
<td>PEC11 series</td>
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<td>NSE10 series</td>
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<td></td>
<td>NSE12 series</td>
</tr>
<tr>
<td></td>
<td>NSE16 series</td>
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</tbody>
</table>

The above draw show how to connect LED’s for the Center Panel. Consider the same concepts of previous section for LED connection. Each driver group is arranged to drive 8 light. The captain panel requires 9 LED, so the "STAB OUT OF TRIM" light terminal is located in the Center panel group (terminal no. 23) also if related to the Captain panel. The related cathode should be wired to the Common Cathode 3 (terminal 21 or 22) together with other Center panel lights (see above draw).
The above draw shows the connections for the Copilot side glare-shield. Consider the same concepts of previous section for LED connection. The glare pushbuttons allow the acknowledgment of warnings. Depending by the current alarm status the pushbutton action shut-down the warning horn, get steady a flashing light, extinguish or recall a warning signal.