

Multi Board ?????

- Sheet - Hierarchical Design
 - Multi Channel
- Multi Board Design
- Embedded Board Array

Hierarchical Design

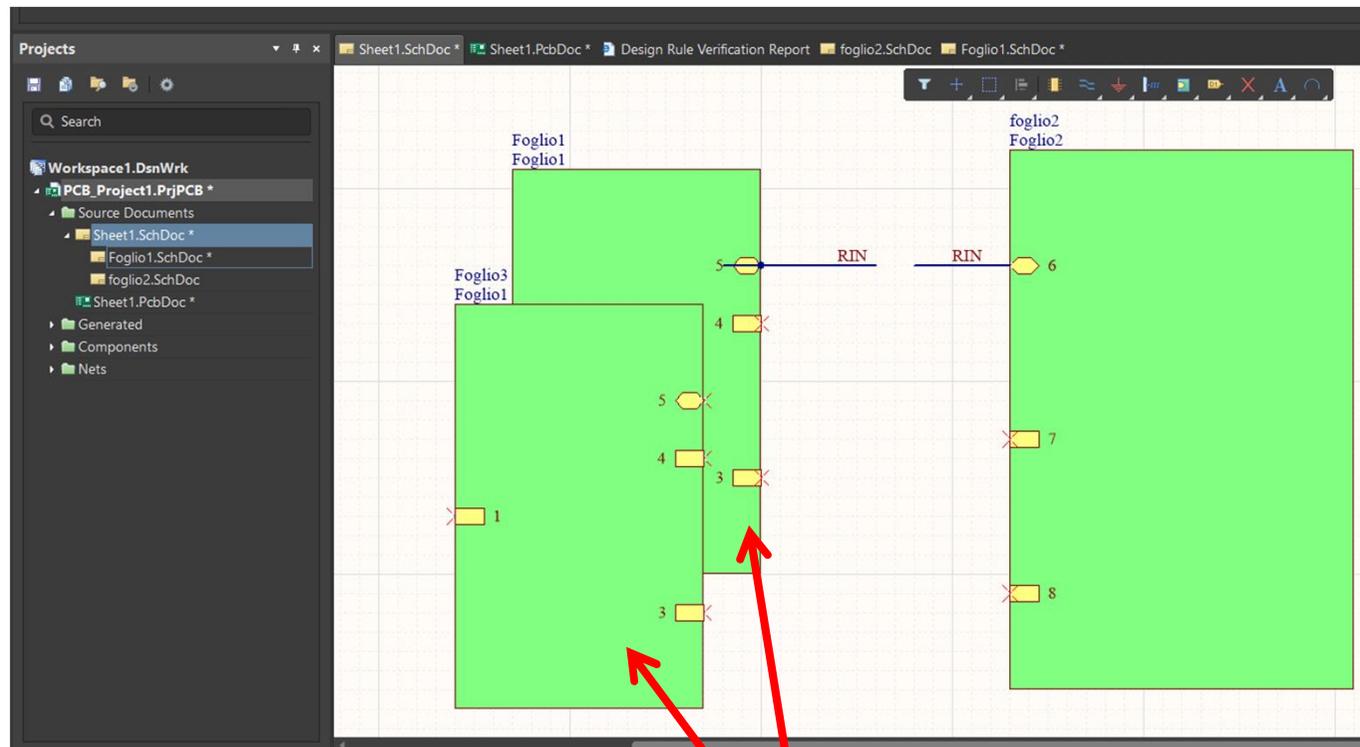
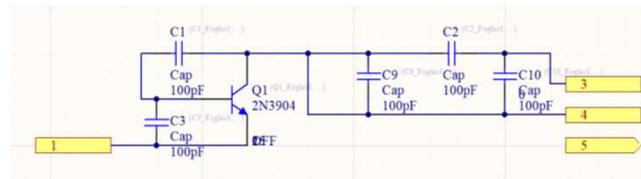
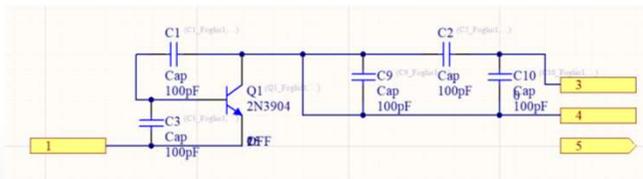
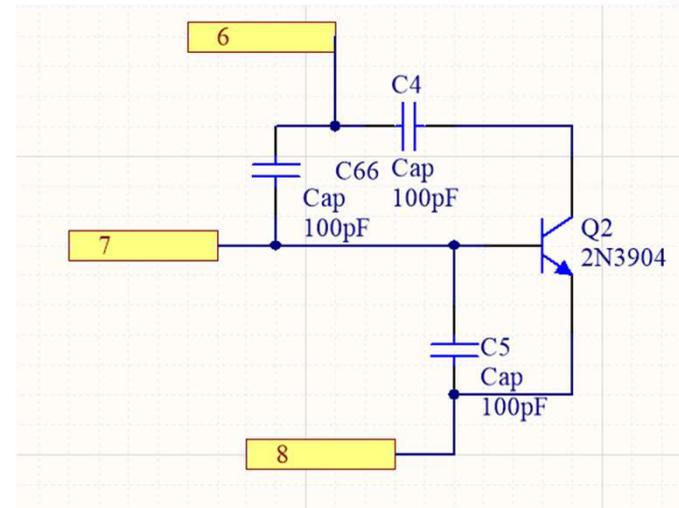
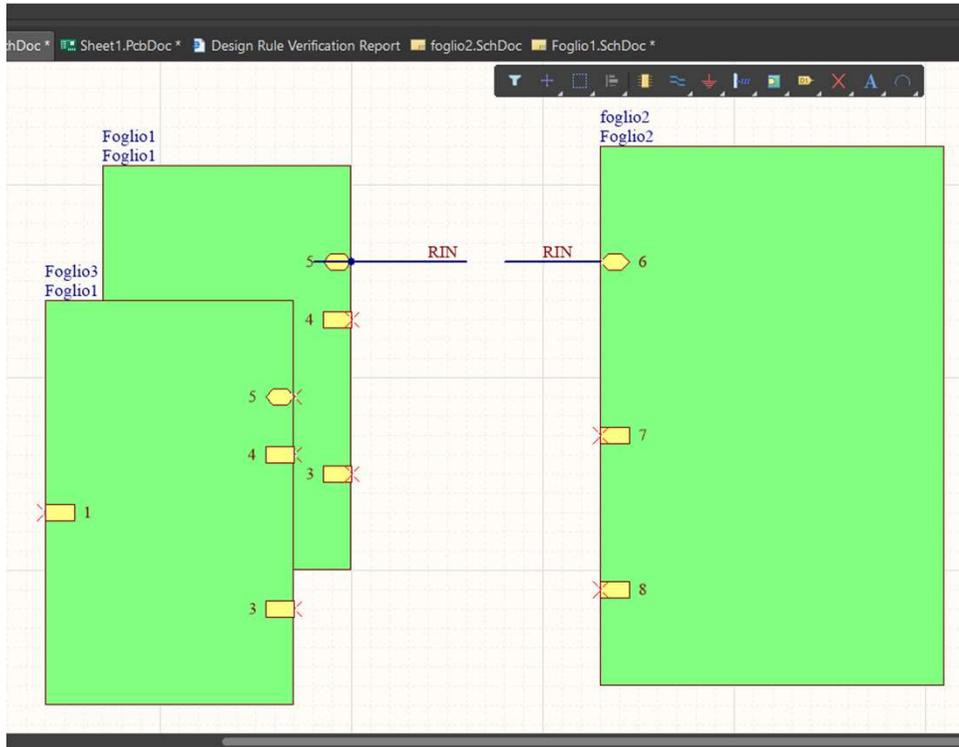
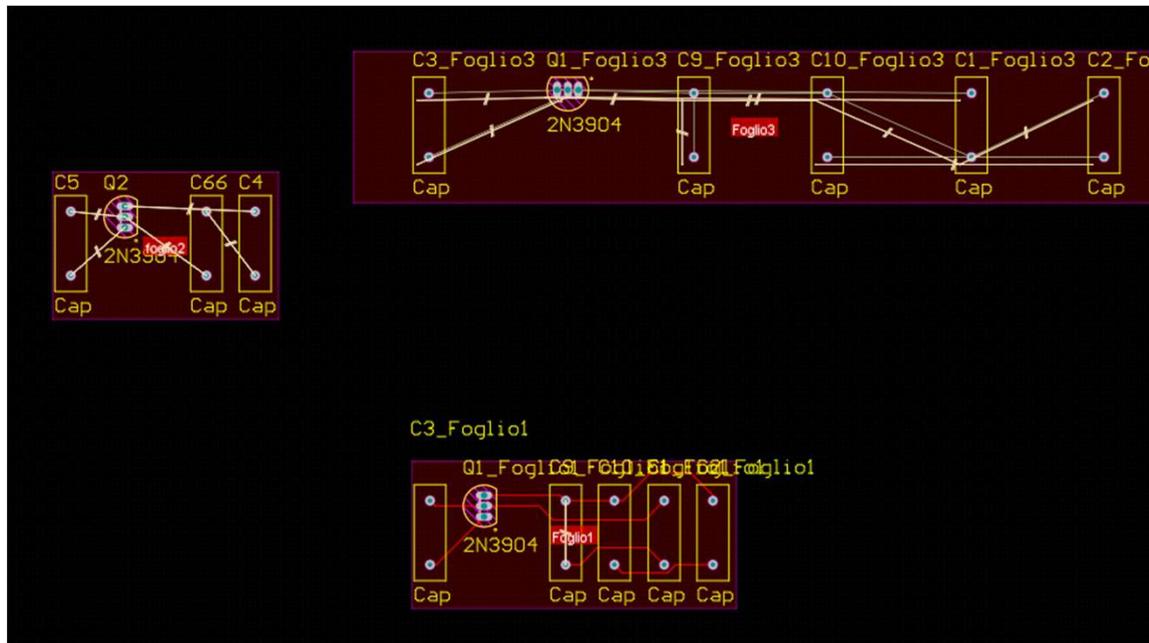


Diagramma a blocchi in cui posso inserire più copie dello stesso schematico

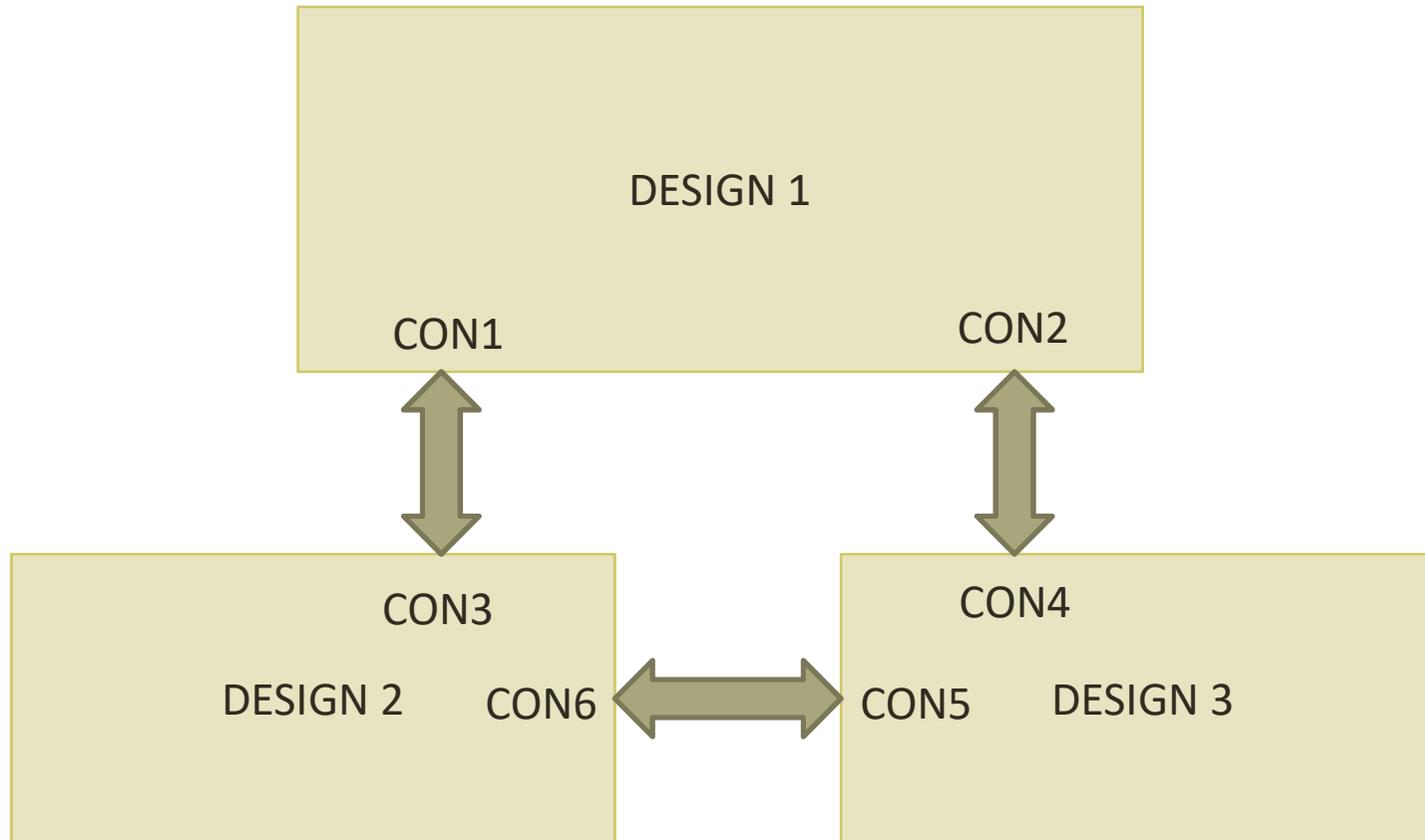
Hierarchical Design



Hierarchical Design



Multiboard Design



Multiboard Design

Lo schematico a blocchi, in cui ogni board è rappresentato da un PCB, permette di verificare la correttezza dei collegamenti.

Permette di verificare l'assemblaggio meccanico di più boards.

Di verificare la correttezza dei cavi di collegamento.

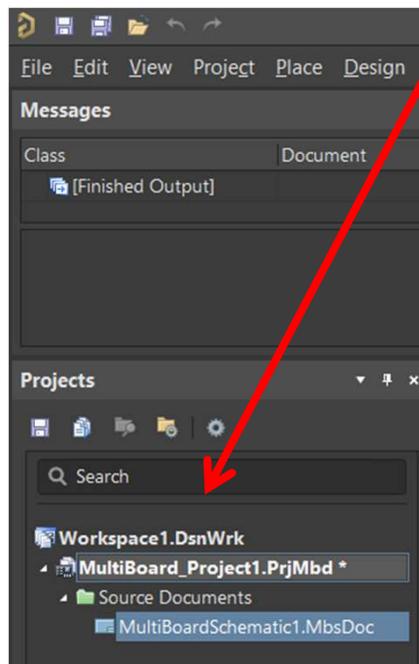
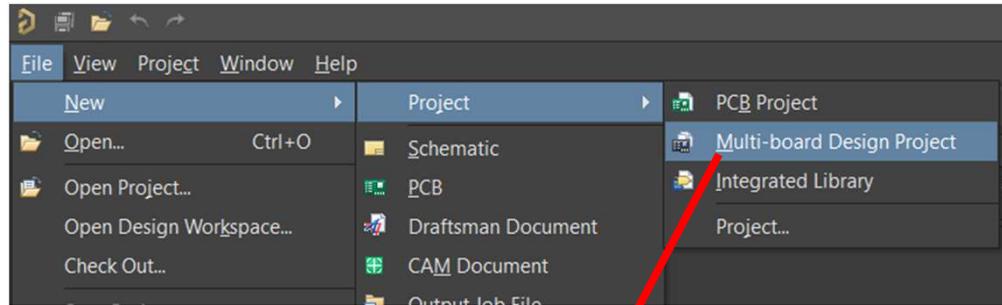
Il plug-in di boards che vanno inserite come componenti .

Si realizza attraverso un progetto dedicato alle Multi Board

Multiboard Design

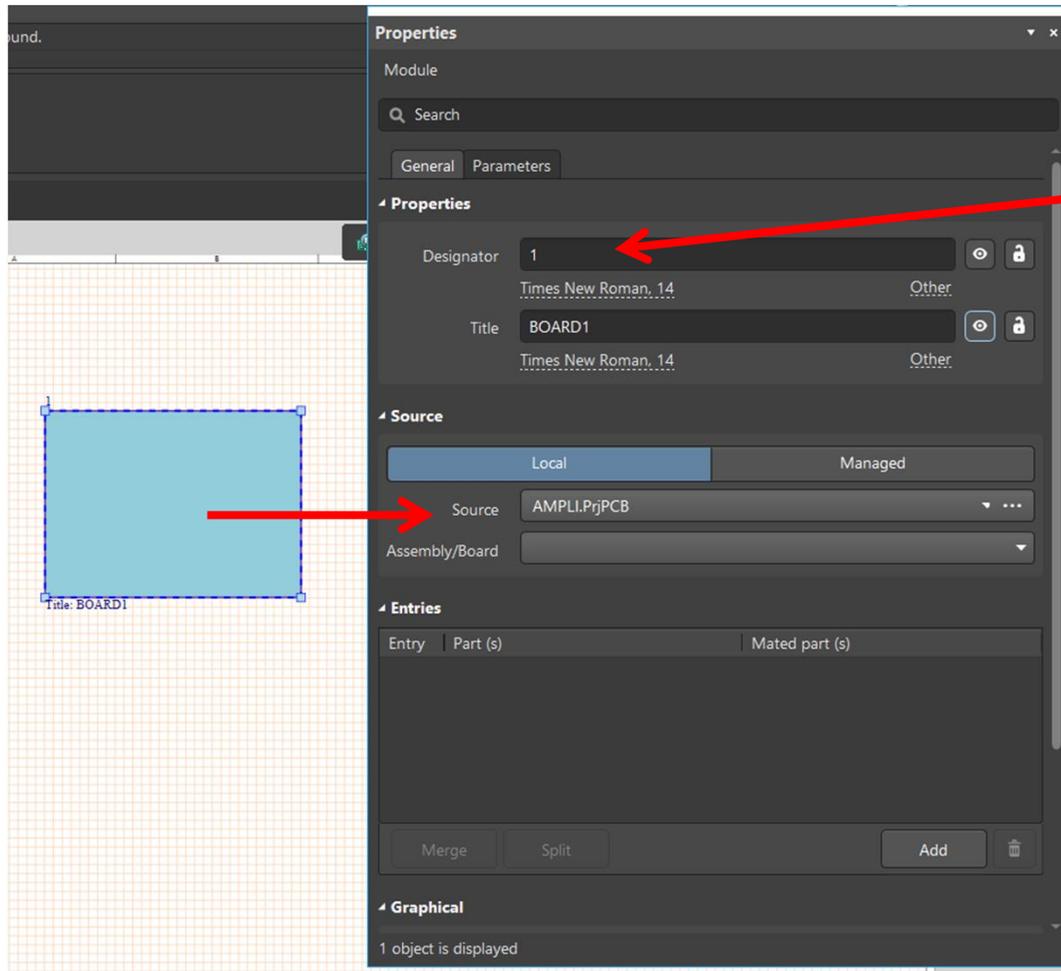
- Create an Altium Designer Multi-board project and add a Multi-board schematic document to the project.
- Place graphical blocks (Modules) in the Schematic to logically represent the child projects.
- Link each Module to its appropriate child project.
- Import the child project connectivity data into the system design.
- Add connections between Modules to create the logical system design.

Multiboard Design



Module
Entry
Cable
Graphics

Multiboard Design - Module

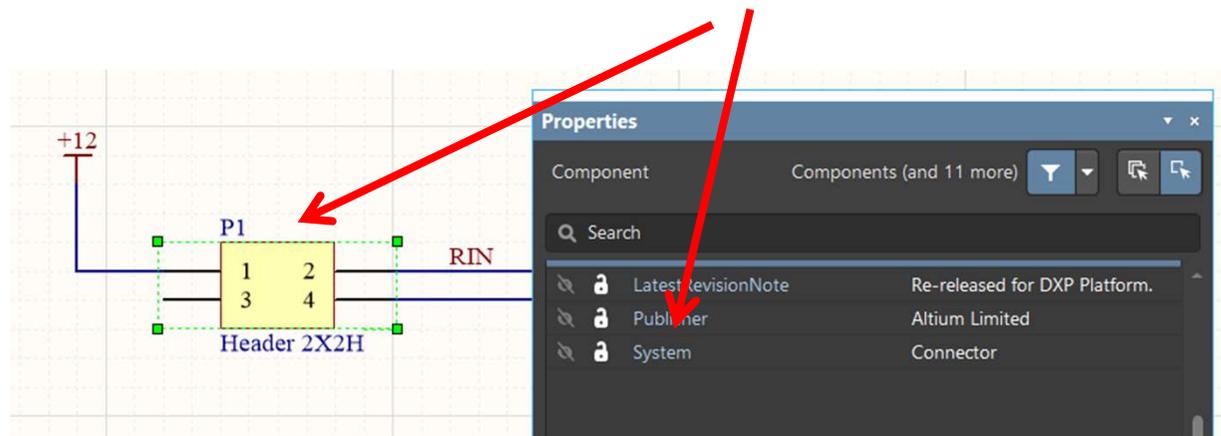


Stesse regole di uno schematico a livello superiore

Multiboard Design – Module Connector

In ogni schematico di origine occorre indicare quali connettori sono da rendere disponibili al livello superiore.

Nelle 'Properties' del componente occorre aggiungere il parametro System con valore Connector



Multiboard Design – Import from Child Project

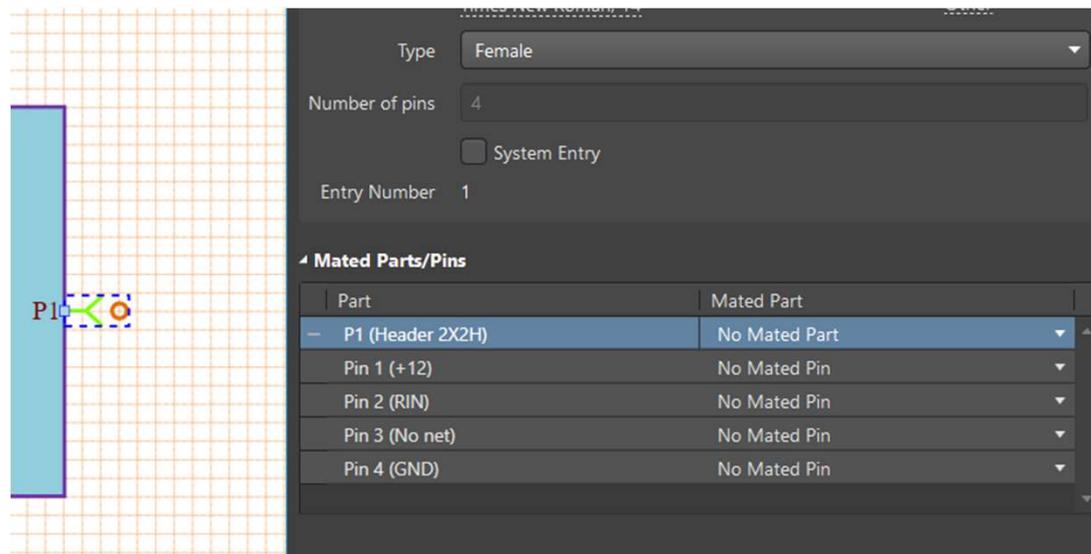
Il link fra il modulo e il progetto d'origine occorre effettuarlo attraverso l'importazione delle caratteristiche.

The image shows a workflow in Altium Designer for importing characteristics from a child project. On the left, the 'Design' menu is open, with 'Import From Selected Child Projects' highlighted. In the center, the 'Engineering Change Order' dialog box is displayed, showing a table of modifications. A red arrow points from the 'P1' entry in the table to a component labeled 'P1' on a PCB schematic. The schematic is titled 'BOARD3'.

| Engineering Change Order | | | | | | |
|-------------------------------------|-------------------|-------------------------------|--------------------------------------|--------|------|---------|
| Modifications | | | | Status | | |
| Enable | Action | Affected Object | Affected Document | Check | Done | Message |
| <input type="checkbox"/> | Add Components(1) | | | | | |
| <input checked="" type="checkbox"/> | Add | P1 to Module 1 (AMPLI.PrjPCB) | In MultiBoardSchematic1.MbsDoc (From | ✓ | ✓ | |

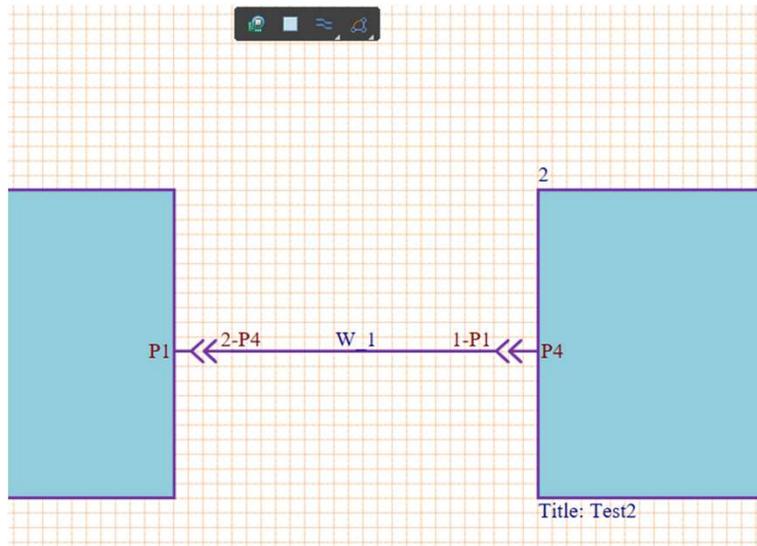
Multiboard Design

L'importazione delle caratteristiche mette a disposizione i parametri dei connettori che sono stati definiti per il livello superiore.



Fino a che il connettore non è connesso a un altro, i pin sono machiati come 'No MATED Pin'

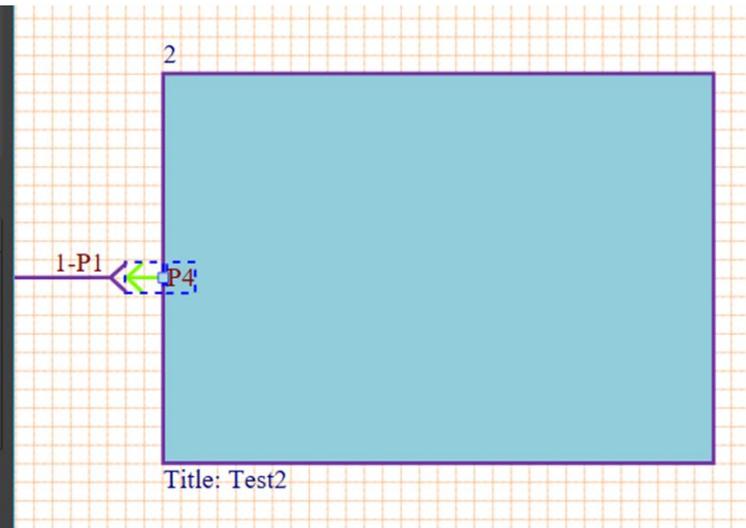
Multiboard Design



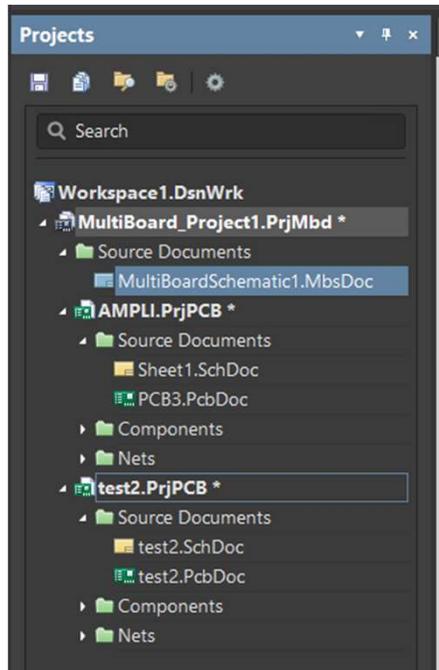
Number of pins 4
 System Entry
Entry Number 1

▲ Mated Parts/Pins

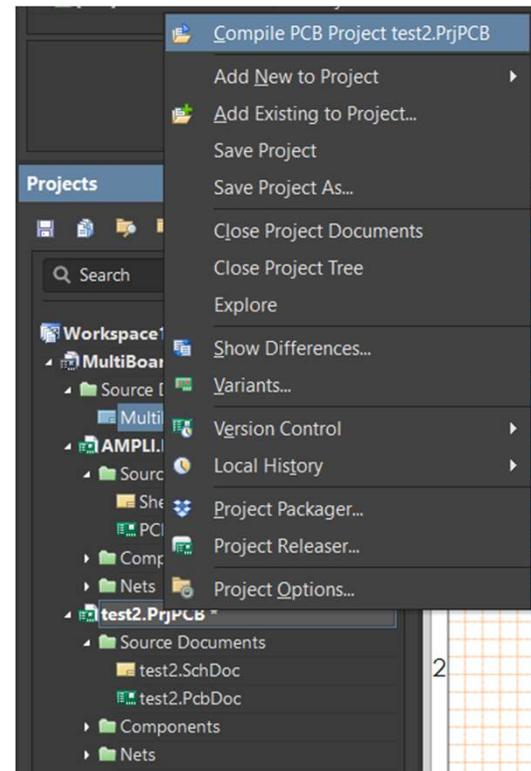
| Part | Mated Part |
|-----------------|-------------|
| P4 (Header 2X2) | Wires (W_1) |
| Pin 1 (+12) | W_1-W1 |
| Pin 2 (RIN) | W_1-W2 |
| Pin 3 (No net) | W_1-W3 |
| Pin 4 (GND) | W_1-W4 |



Multiboard Design

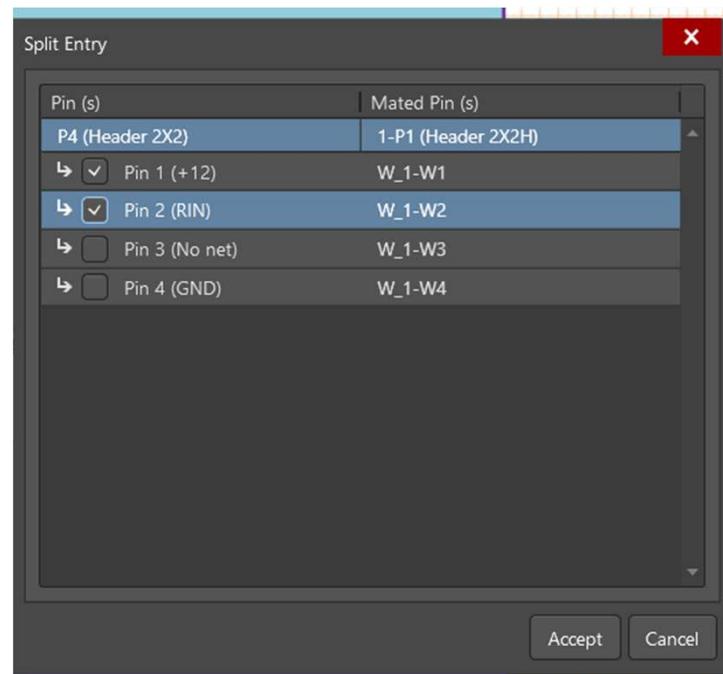
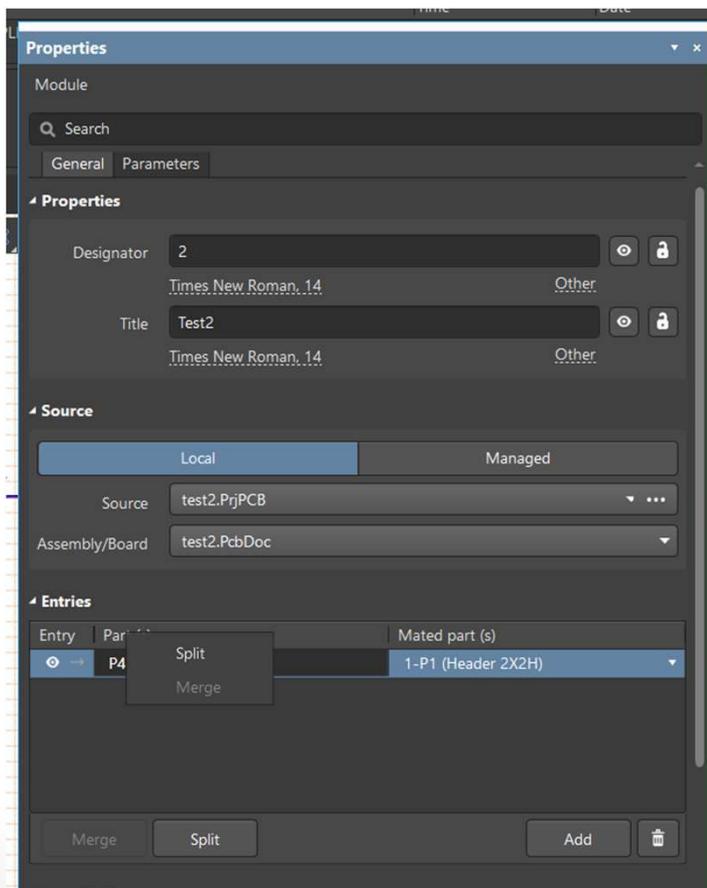


Nel Progetto vengono inseriti anche tutti i documenti dei progetti di origine.
Si possono compilare selezionando il nome e 'Compile.....'

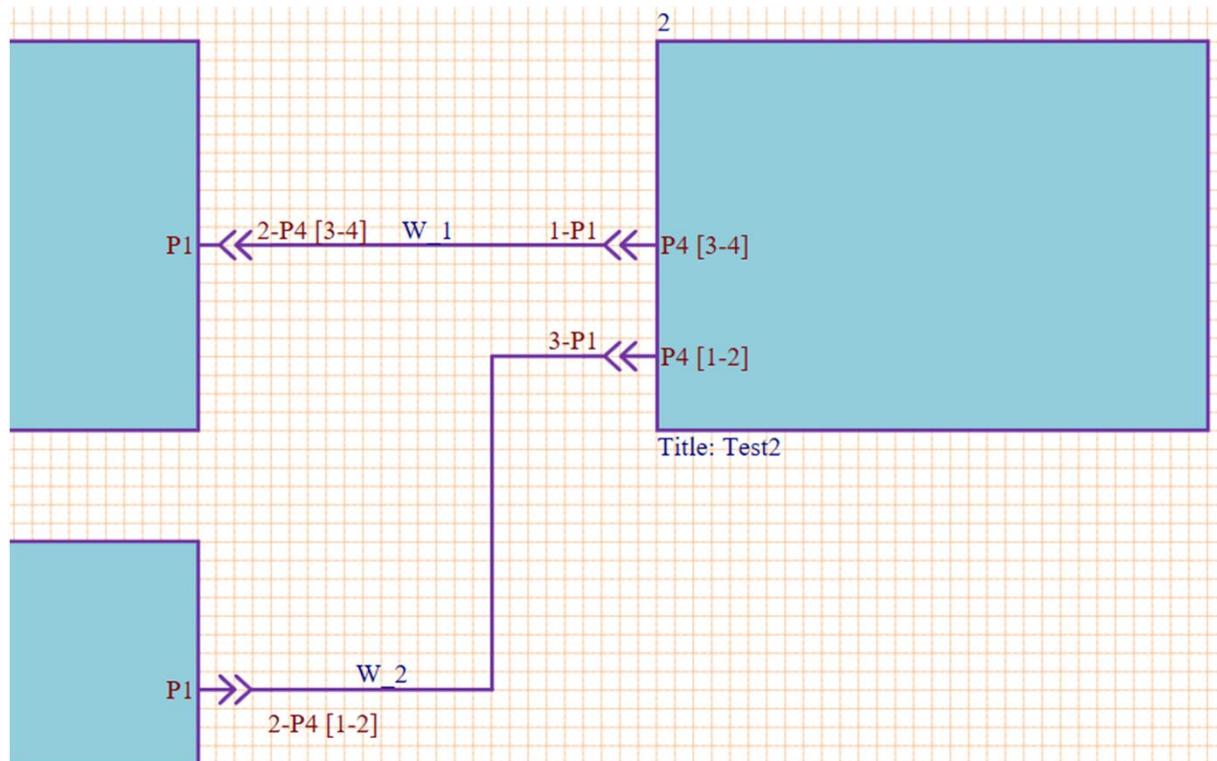


Multiboard Design – Split connection

Il connettore di una board può essere suddiviso in più collegamenti attraverso lo SPLIT. Divide il connettore ma non lo duplica.



Multiboard Design – Split connection



Multiboard Design – Cable

The screenshot displays the Altium Designer interface for a cable design. On the left, the Properties panel is open to the 'Cable' section. The 'Designator' is set to 'C_1', the font is 'Times New Roman, 14', and the 'Number Of Connections' is '2'. Below this, the 'Entries' table lists four connection points with their respective part names. At the bottom, the 'Connections' table details the net connections between these entries.

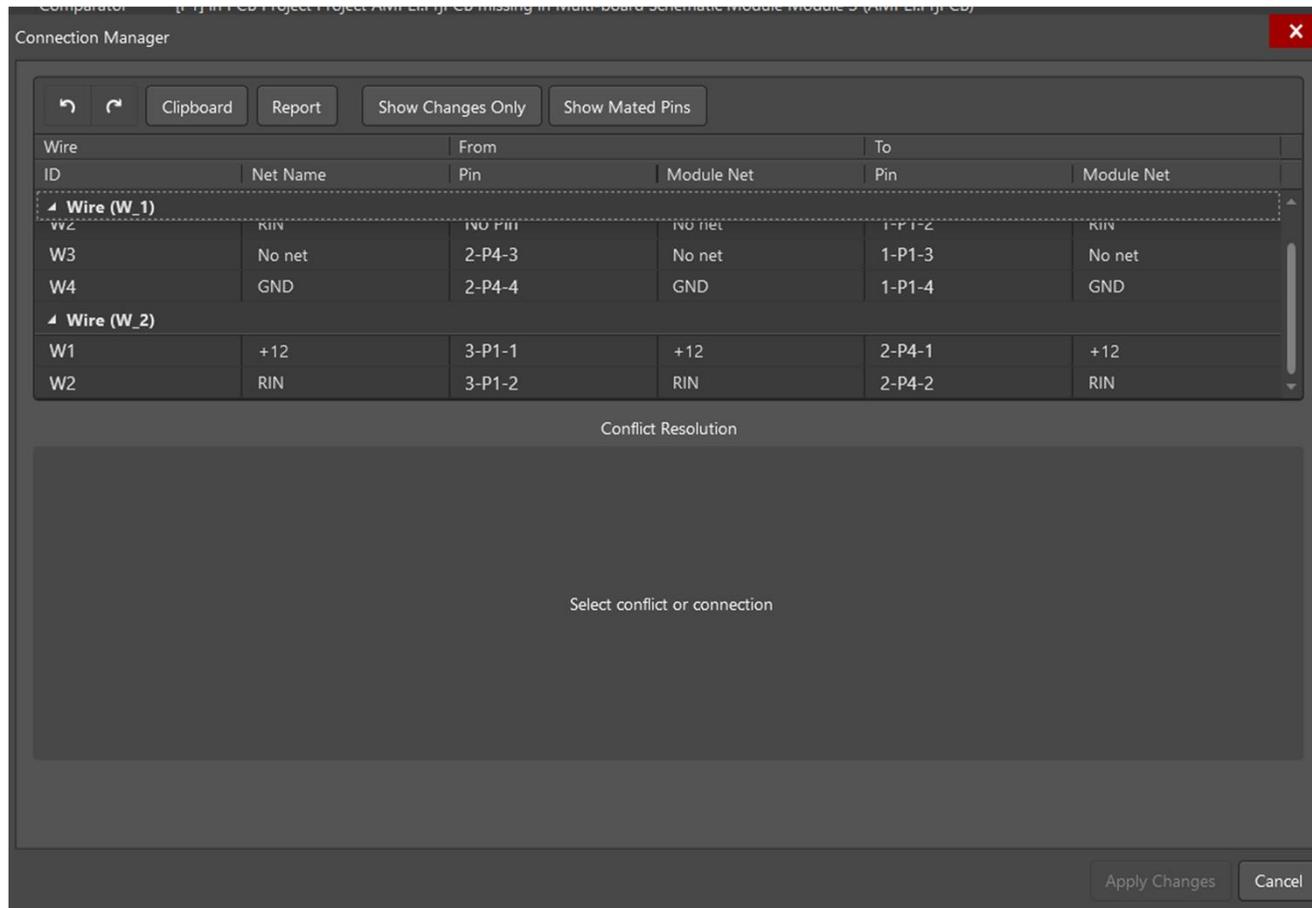
| Entry | Designator | Part | Mated |
|-------|------------|------|--------------------|
| → | Entry_1 | | 1-P1 (Header 2X2H) |
| ← | Entry_2 | | 2-P4 (Header 2X2) |
| ← | Entry_3 | | 3-P1 (Header 2X2H) |
| ← | Entry_4 | | 2-P4 (Header 2X2) |

| # | Net | From | To |
|---------|-------|------------------------|------------------------|
| + C_1.1 | group | 1-P1/C_1-Entry_1 | 2-P4 [3-4]/C_1-Entry_2 |
| + C_1.2 | group | 2-P4 [3-4]/C_1-Entry_2 | 3-P1/C_1-Entry_3 |
| + C_1.3 | group | 3-P1/C_1-Entry_3 | 2-P4 [1-2]/C_1-Entry_4 |

The schematic diagram on the right shows two vertical blue bars representing headers. The top bar is labeled 'P1' and has 'Entry 3' pointing to it from the right. The bottom bar is also labeled 'P1' and has 'Entry 3' pointing to it from the right. On the right side, there are two vertical blue bars representing headers. The top one is labeled '2' and has 'Entry 2' pointing to it from the left. The bottom one is labeled '2' and has 'Entry 4' pointing to it from the left. A green line connects 'Entry 1' to 'Entry 2'. A black line connects 'Entry 2' to 'Entry 3'. A black line connects 'Entry 3' to 'Entry 4'. The title bar shows 'PCB3.PcbDoc', 'Sheet1.SchDoc', and 'test2.PcbDoc'.

Multiboard Design – Connection Manager

(da DESIGN) indica tutti i collegamenti fra i moduli.



Multiboard Design – Up Date

I progetti di riferimento possono essere modificati in qualsiasi momento.

Le variazioni non sono riportate in automatico nella Multi Board

L'aggiornamento avviene attraverso due modalità:

Import From Child Project –

Importa gli up date da tutti i sotto progetti

Import From Selected Child –

Importa l'update del solo modulo selezionato in quel momento

Multiboard Design – Conflict

04/04/2018 Augusto Pieracci

Connection Manager

Clipboard Report Show Changes Only Show Mated Pins

| Wire | From | To | | | |
|------------|----------|--------|------------|--------|------------|
| ID | Net Name | Pin | Module Net | Pin | Module Net |
| Wire (W_1) | | | | | |
| W1 | +12 | No Pin | No net | 1-P1-1 | +12 |
| W2 | RIN1 | No Pin | No net | 1-P1-2 | GND |
| W3 | RIN | 2-P4-1 | RIN | 1-P1-3 | No net |
| W4 | GND/RIN | 2-P4-4 | GND | 1-P1-4 | RIN |
| Wire (W_2) | | | | | |
| W1 | +12 | 2-P1-1 | +12 | 2-P4-2 | No net |

Conflict Resolution

Swap Pins

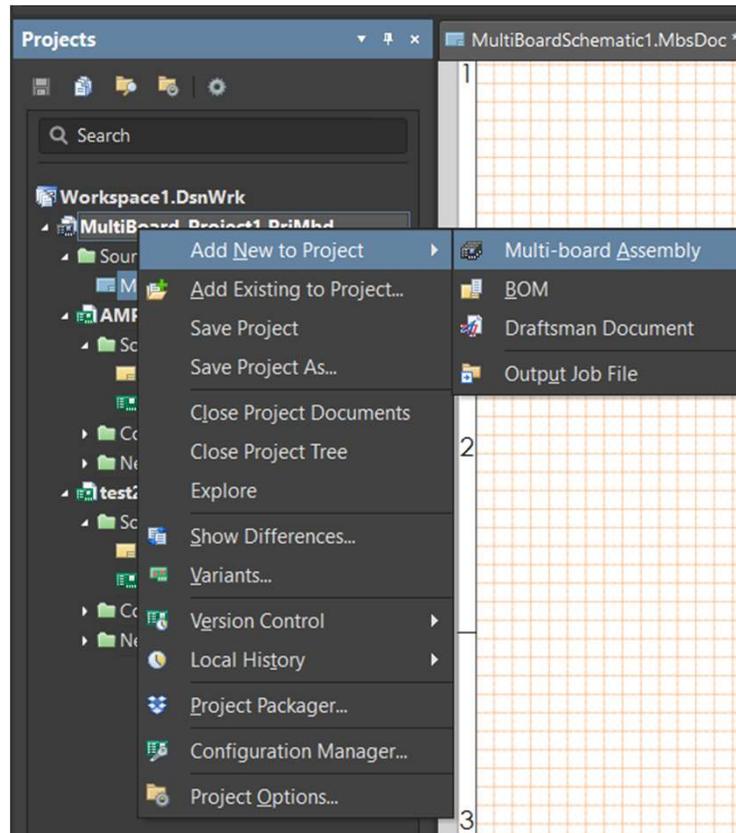
Swap Wires

Confirm Revert

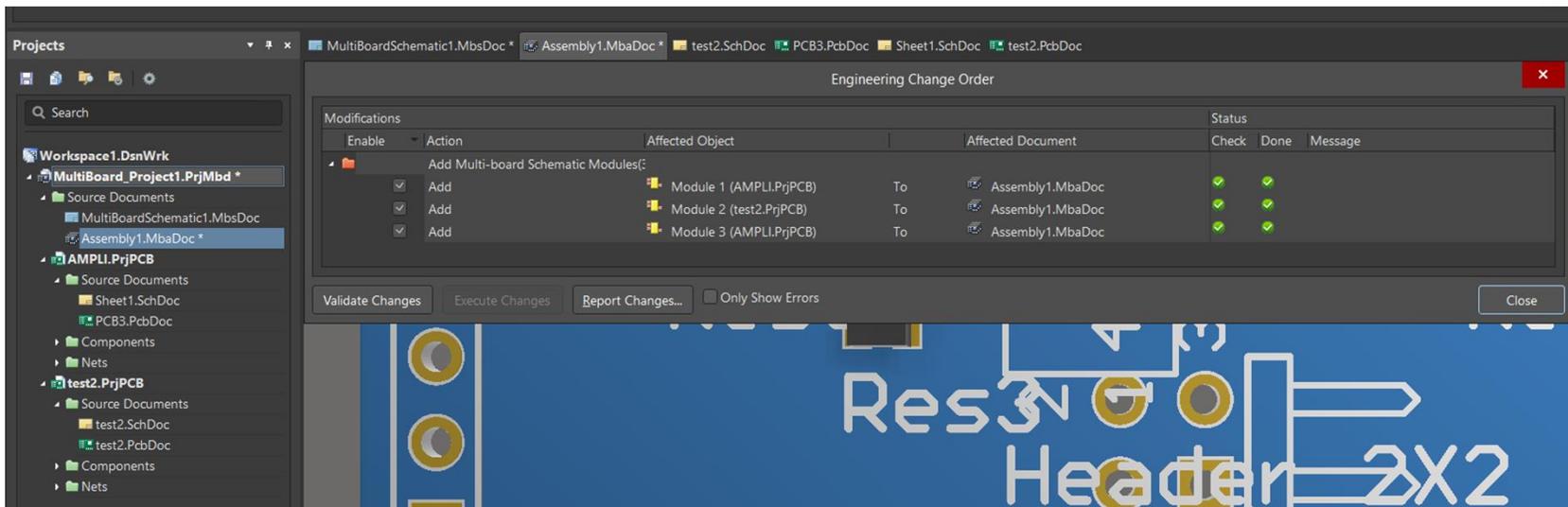
Revert Changes

Apply Changes Cancel

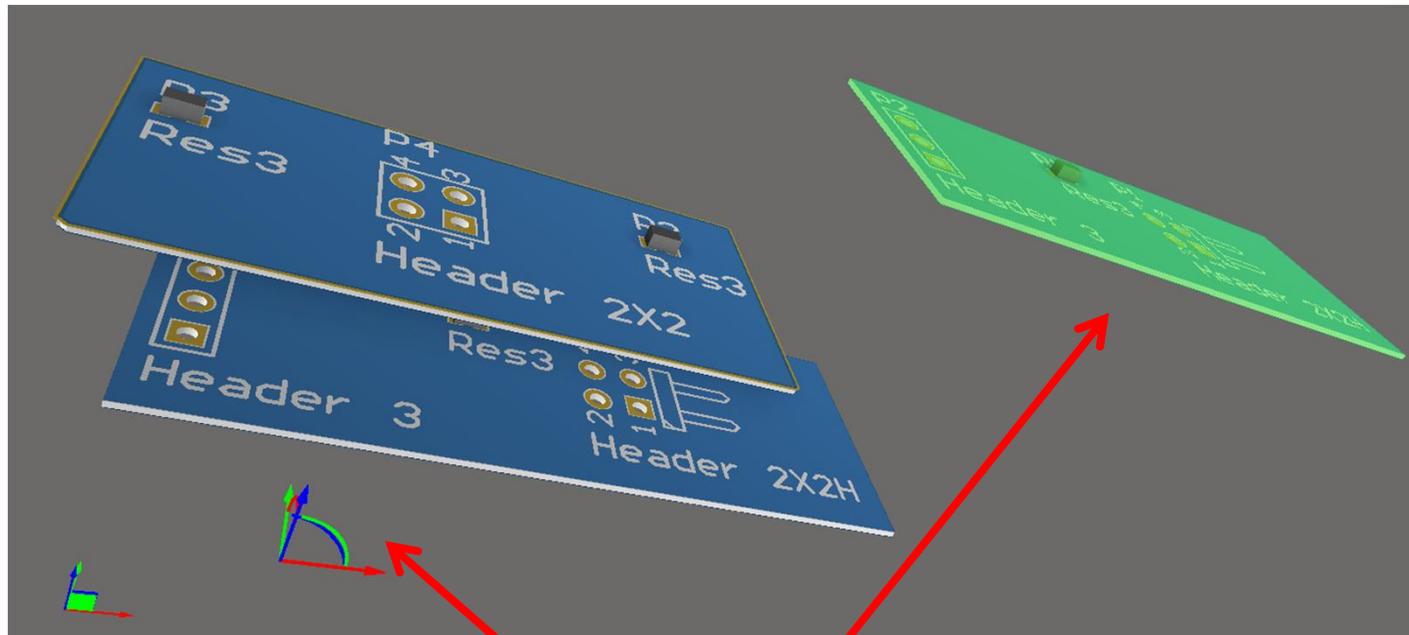
Multiboard Design – Assembly



Multiboard Design – Assembly



Multiboard Design - Assembly



Riferimento assoluto

Riferimento Board

X Rosso

Y Verde

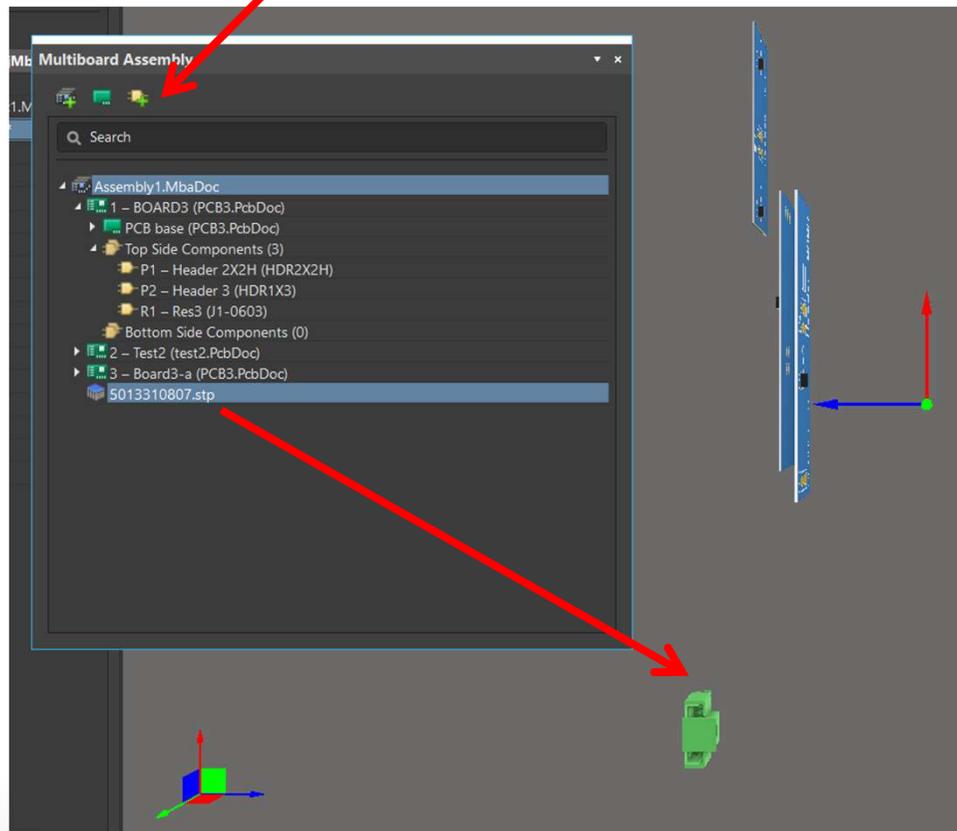
Z Blu

Short cut : Shift

Multiboard Design – Adding

Oggetto 3D

Possibilità di aggiungere altri oggetti:



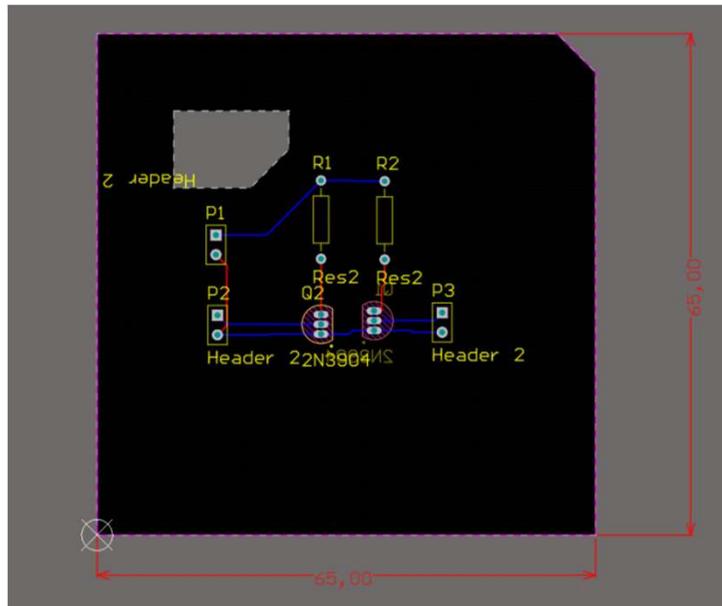
Altri MBA

Altri PCB

Oggetto 3D

Embedded Board Array

Scopo della funzione è di replicare lo stesso layout su una stessa board.
Permette di realizzare una matrice con N righe e M colonne equi distanziate.



Embedded Board Array

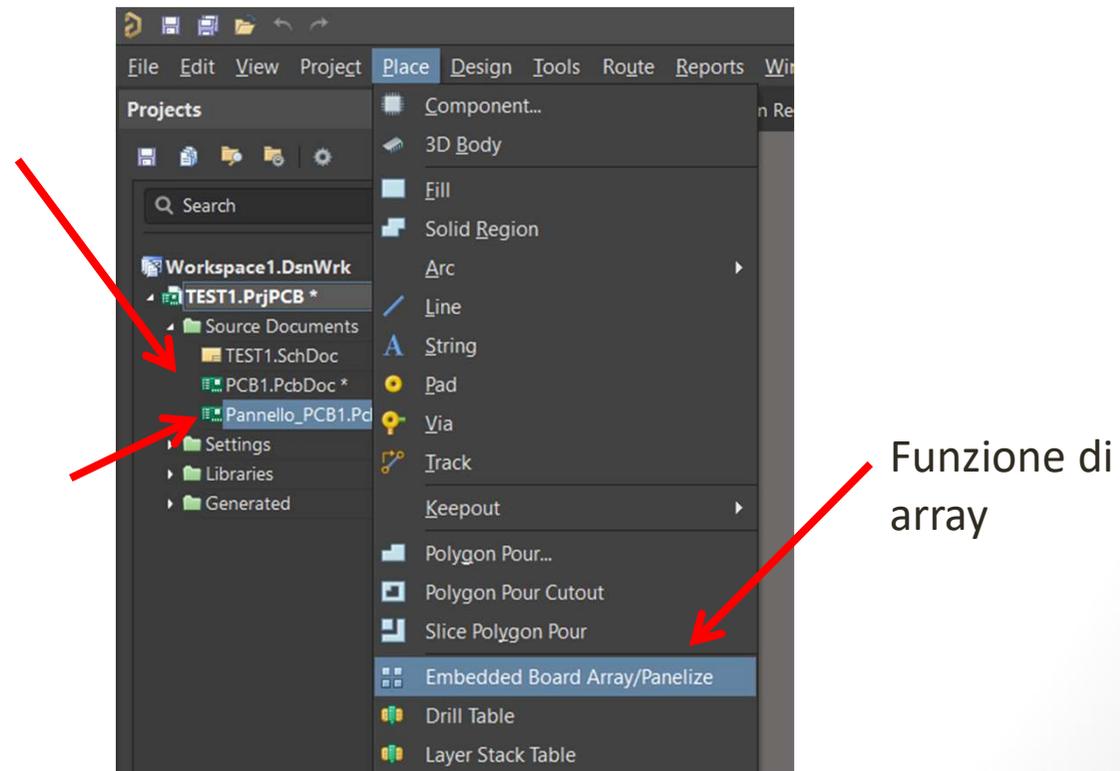
L'array deve essere realizzato su un PCB che non contiene il circuito da replicare.

Per questo motivo si crea un nuovo documento PCB.

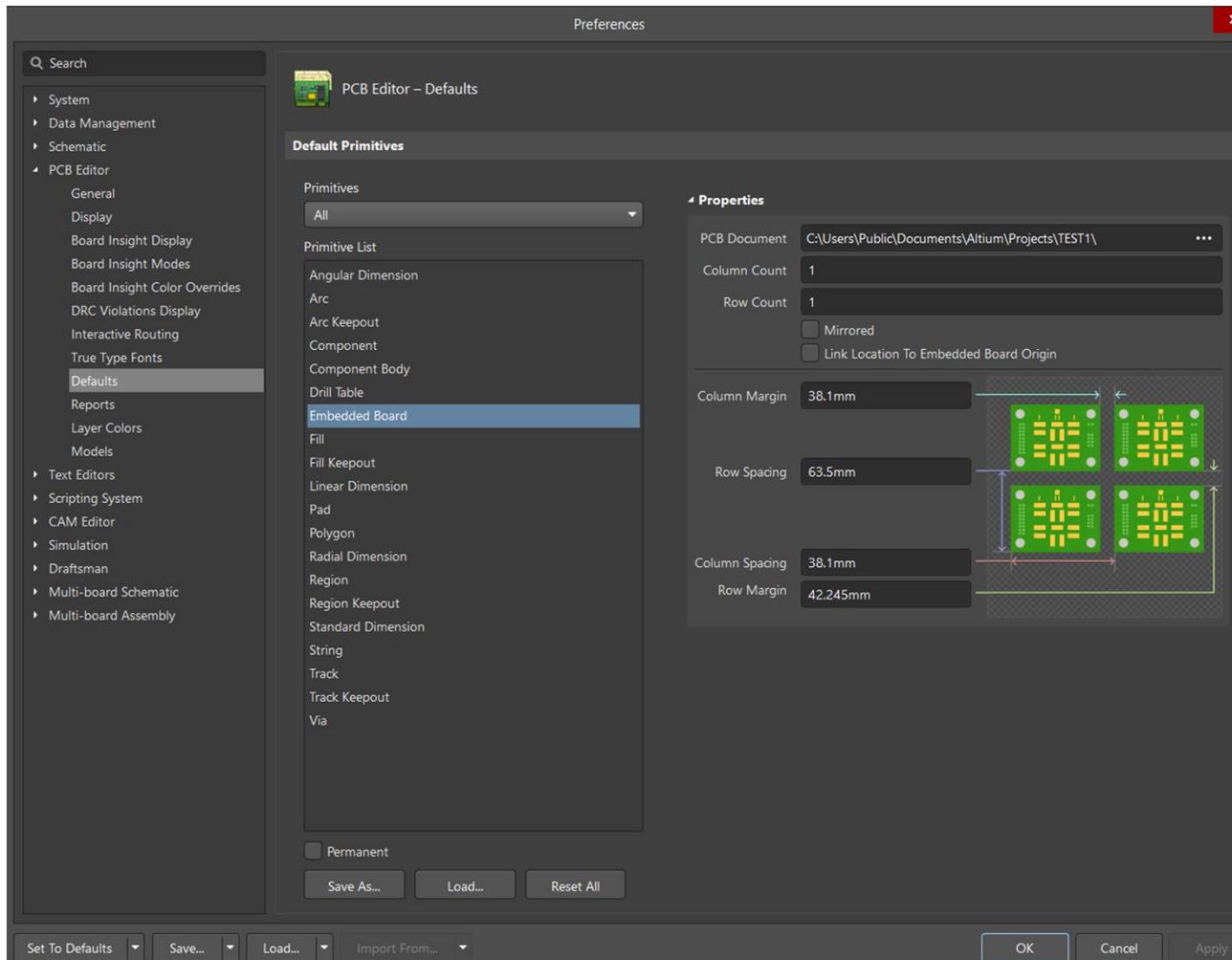
La funzione si attiva da Place- Embedded Board Array

PCB di origine

PCB array



Embedded Board Array



Embedded Board Array

Dalla finestra Properties si possono impostare i parametri e il file PCB da replicare. Si imposta lo spazio fra righe e colonne

PCB di origine

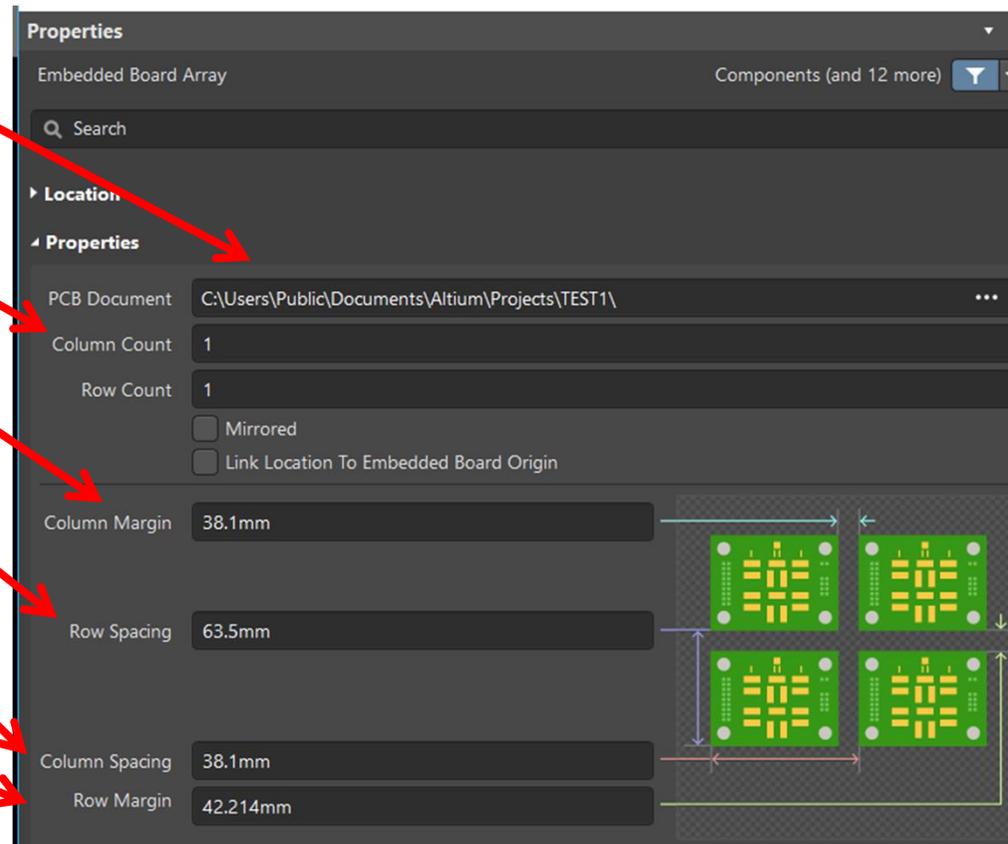
PCB array

Distanza margini
delle colonne

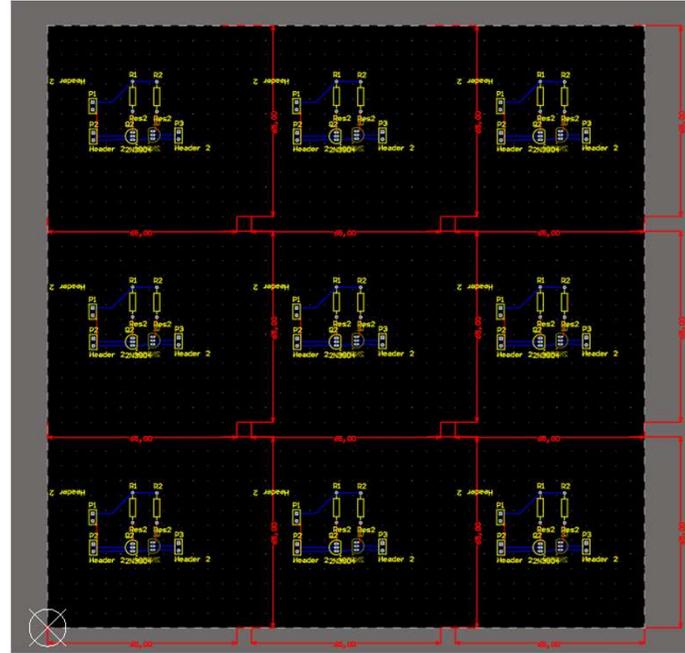
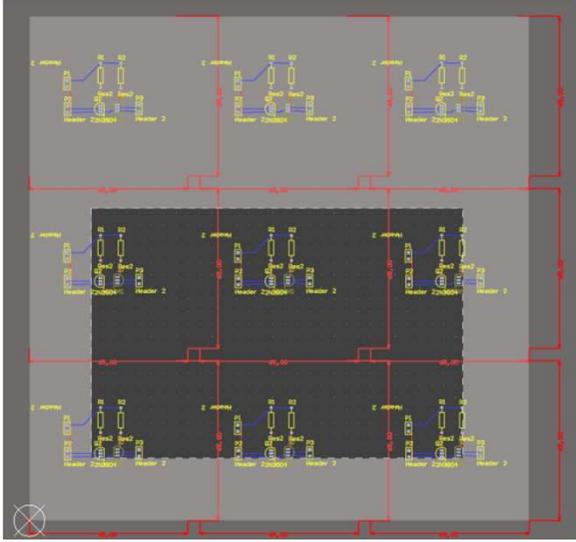
Spazio fra righe

Spazio fra colonne

Distanza margini
delle righe

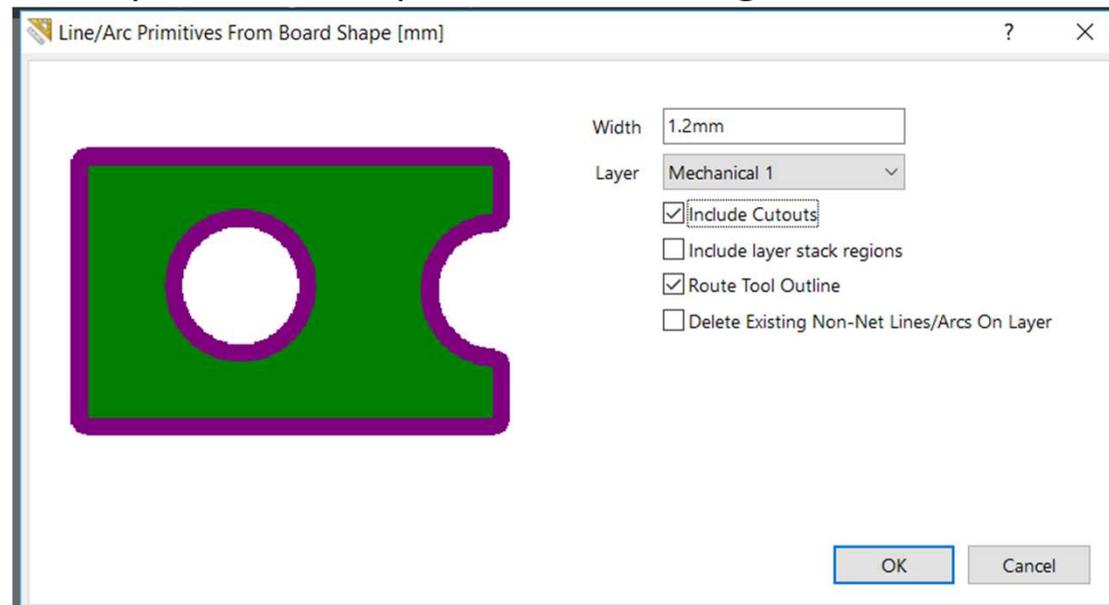


Embedded Board Array



Embedded Board Array

- Si possono inserire più circuiti.
- Le variazioni possono essere fatte nel circuito di origine e sono riportate in automatico nel pannello.
- Il DRC non è valido per il pannello !!!!
- I bordi di taglio possono essere riportati attivandoli nei circuiti di origine.
- Per inserire anche i tagli interni si attiva la modalità di incut nel Board shape
- La BOM si può fare solo per i circuiti di origine

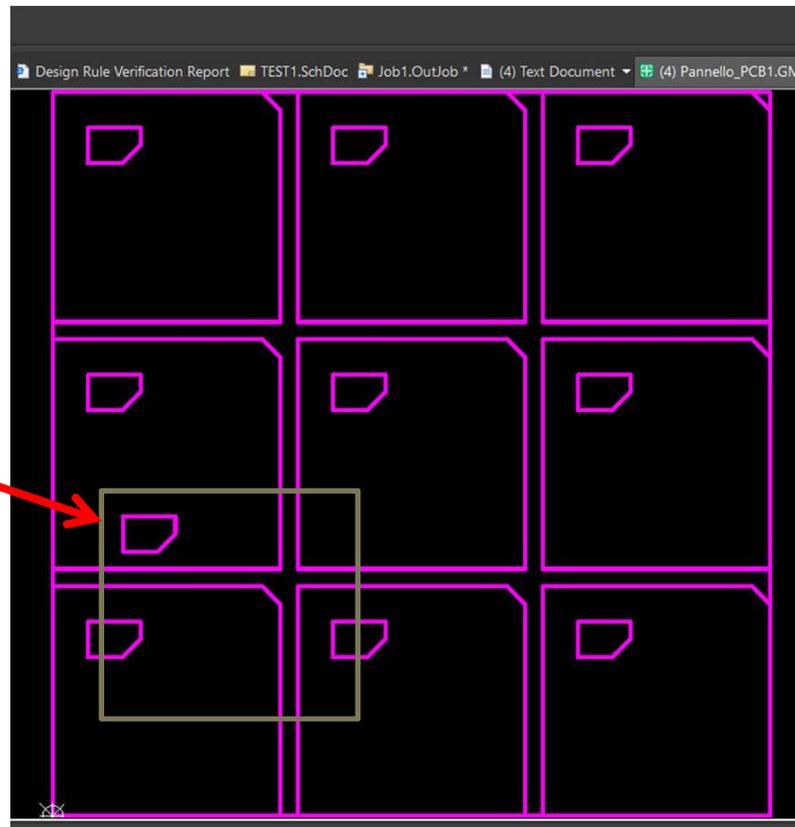


Embedded Board Array

Se voglio inserire un circuito nell'altro attenzione ai tagli dei bordi delle schede.

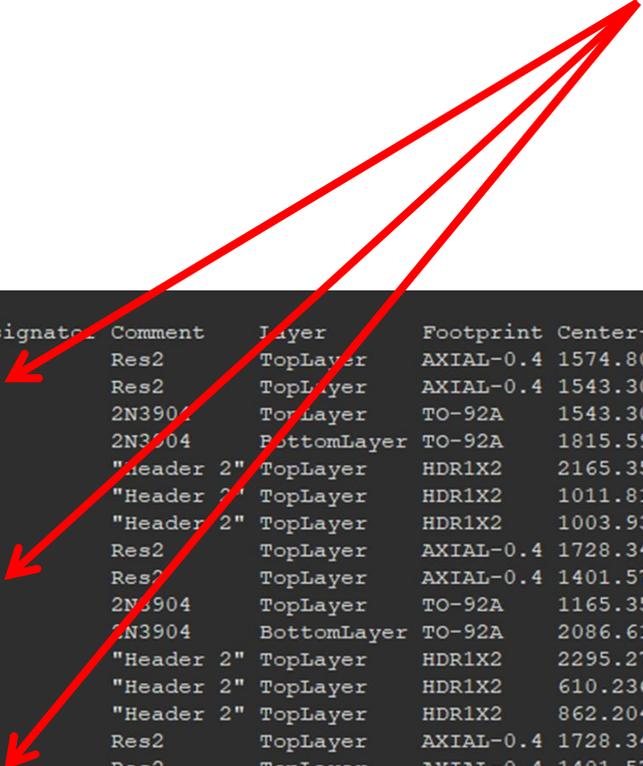
Occorre eliminare il taglio del bordo della scheda che viene inserita all'interno dell'altra

Eliminarla



Embedded Board Array

I riferimenti dei componenti sono gli stessi dei circuiti di origine.



| Designator | Comment | Layer | Footprint | Center-X (mil) | Center-Y (mil) | Rotation | Description |
|------------|------------|-------------|-----------|----------------|----------------|----------|---------------------------------|
| R2 | Res2 | TopLayer | AXIAL-0.4 | 1574.803 | 2755.906 | 90 | Resistor |
| R1 | Res2 | TopLayer | AXIAL-0.4 | 1543.306 | 2791.338 | 90 | Resistor |
| Q2 | 2N3904 | TopLayer | TO-92A | 1543.306 | 2257.086 | 0 | "NPN General Purpose Amplifier" |
| Q1 | 2N3904 | BottomLayer | TO-92A | 1815.591 | 2275.590 | 180 | "NPN General Purpose Amplifier" |
| P3 | "Header 2" | TopLayer | HDR1X2 | 2165.354 | 2266.536 | 270 | "Header, 2-Pin" |
| P2 | "Header 2" | TopLayer | HDR1X2 | 1011.810 | 2253.150 | 270 | "Header, 2-Pin" |
| P1 | "Header 2" | TopLayer | HDR1X2 | 1003.936 | 2662.598 | 270 | "Header, 2-Pin" |
| R2 | Res2 | TopLayer | AXIAL-0.4 | 1728.346 | 488.189 | 90 | Resistor |
| R1 | Res2 | TopLayer | AXIAL-0.4 | 1401.574 | 468.503 | 90 | Resistor |
| Q2 | 2N3904 | TopLayer | TO-92A | 1165.354 | 414.567 | 0 | "NPN General Purpose Amplifier" |
| Q1 | 2N3904 | BottomLayer | TO-92A | 2086.614 | 446.063 | 180 | "NPN General Purpose Amplifier" |
| P3 | "Header 2" | TopLayer | HDR1X2 | 2295.276 | 199.607 | 270 | "Header, 2-Pin" |
| P2 | "Header 2" | TopLayer | HDR1X2 | 610.236 | 398.819 | 270 | "Header, 2-Pin" |
| P1 | "Header 2" | TopLayer | HDR1X2 | 862.204 | 363.385 | 270 | "Header, 2-Pin" |
| R2 | Res2 | TopLayer | AXIAL-0.4 | 1728.346 | 3244.095 | 90 | Resistor |
| R1 | Res2 | TopLayer | AXIAL-0.4 | 1401.574 | 3224.409 | 90 | Resistor |
| Q2 | 2N3904 | TopLayer | TO-92A | 1165.354 | 3170.472 | 0 | "NPN General Purpose Amplifier" |
| Q1 | 2N3904 | BottomLayer | TO-92A | 2086.614 | 3201.868 | 180 | "NPN General Purpose Amplifier" |