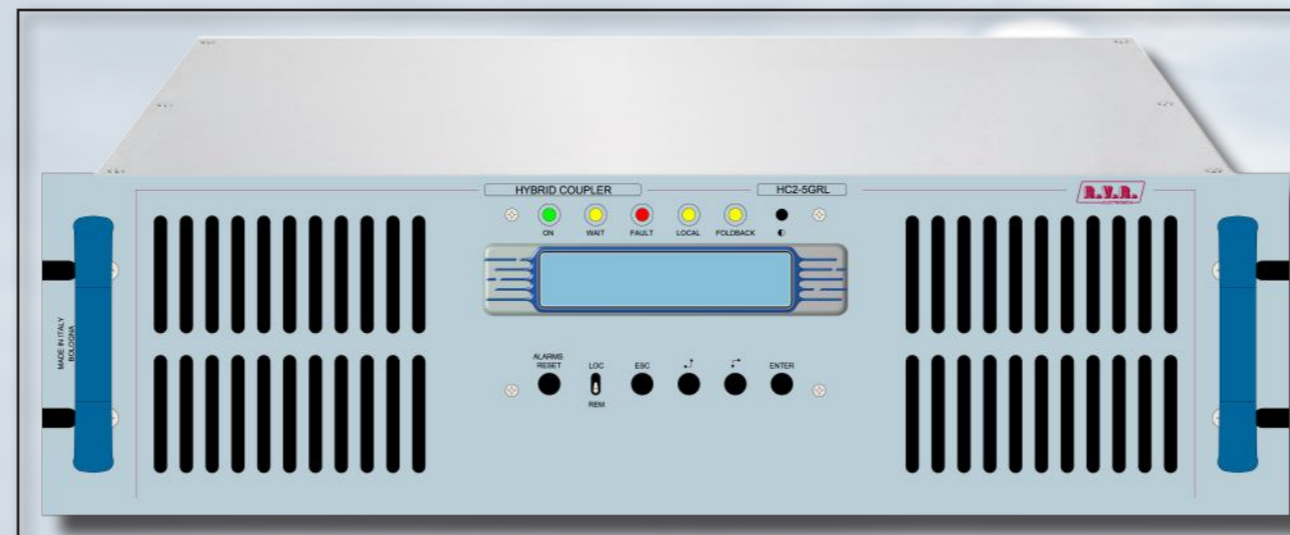




# HC2-5GRL

## TECHNICAL ANNEX VOLUME 2



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Zona Industriale Roveri - 40138 Bologna - Italy  
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Member of CISQ Federation



CERTIFIED MANAGEMENT SYSTEM  
ISO 9001



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Manufactured by R.V.R. ELETTRONICA Italy



## Appendix A Piani di montaggio, schemi elettrici, liste componenti / *Component layouts, schematics, bills of material*

Questa parte del manuale contiene i dettagli tecnici riguardanti la costruzione delle singole schede componenti il HC2-5GRL. L'appendice è composta dalle seguenti sezioni:

*This part of the manual contains the technical details about the different Cards of the HC2-5GRL. This appendix is composed of the following sections:*

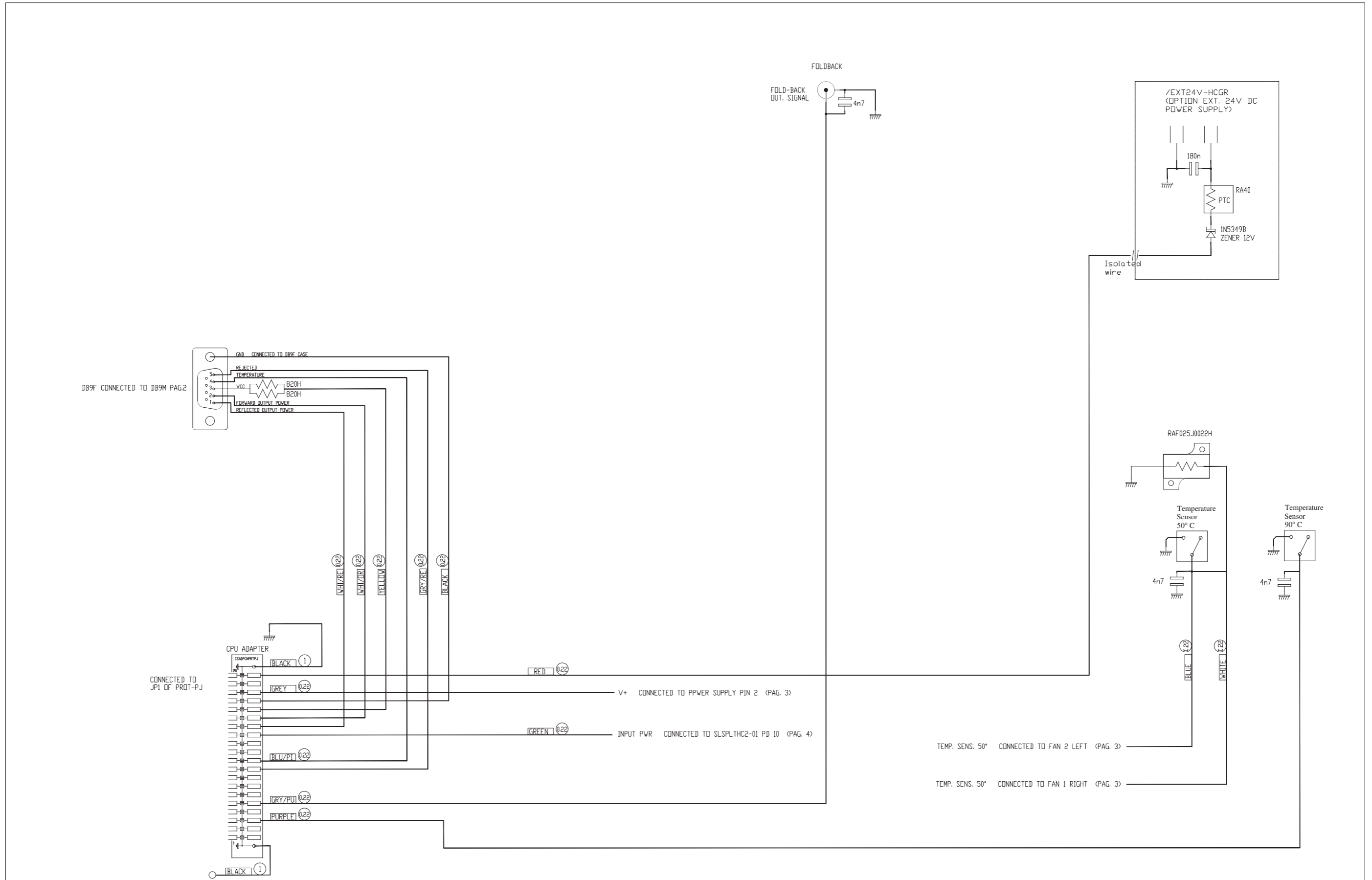
| Description                  | RVR Code       | Vers. | Page |
|------------------------------|----------------|-------|------|
| Wiring Diagram               | KKCAB021A      | 1.3   | 1    |
| Phase Shifter Card           | SLPHSHHC2-01   | 1.0   | 6    |
| Power Splitter Card          | SLSPLTHC2-01   | 1.0   | 8    |
| Power Combiner Card          | SLCMB1HC2-01   | 1.1   | 11   |
| CPU Card                     | PROTPJ-HCLCD   | 3.1   | 14   |
| CPU Adapter Card             | SLADPCNP RTPJ  | 2.1   | 21   |
| Power Supply                 | PSSWEPP10024   | 1.0   | 28   |
| PROT-F Interface Add-On Card | SLIN0411R02V01 | 1.2   | 24   |
| Meter Card                   | SL042MT1001    | 1.1   | 27   |

| Description            | Spare Parts  |
|------------------------|--------------|
| Fan                    | VTL9GL1224J  |
| CPU panel & Display    | SP-PAN021A   |
| Switching power supply | PSSWEPP10024 |
| Power Meter Section    | SP-MTR021A   |

### Document History

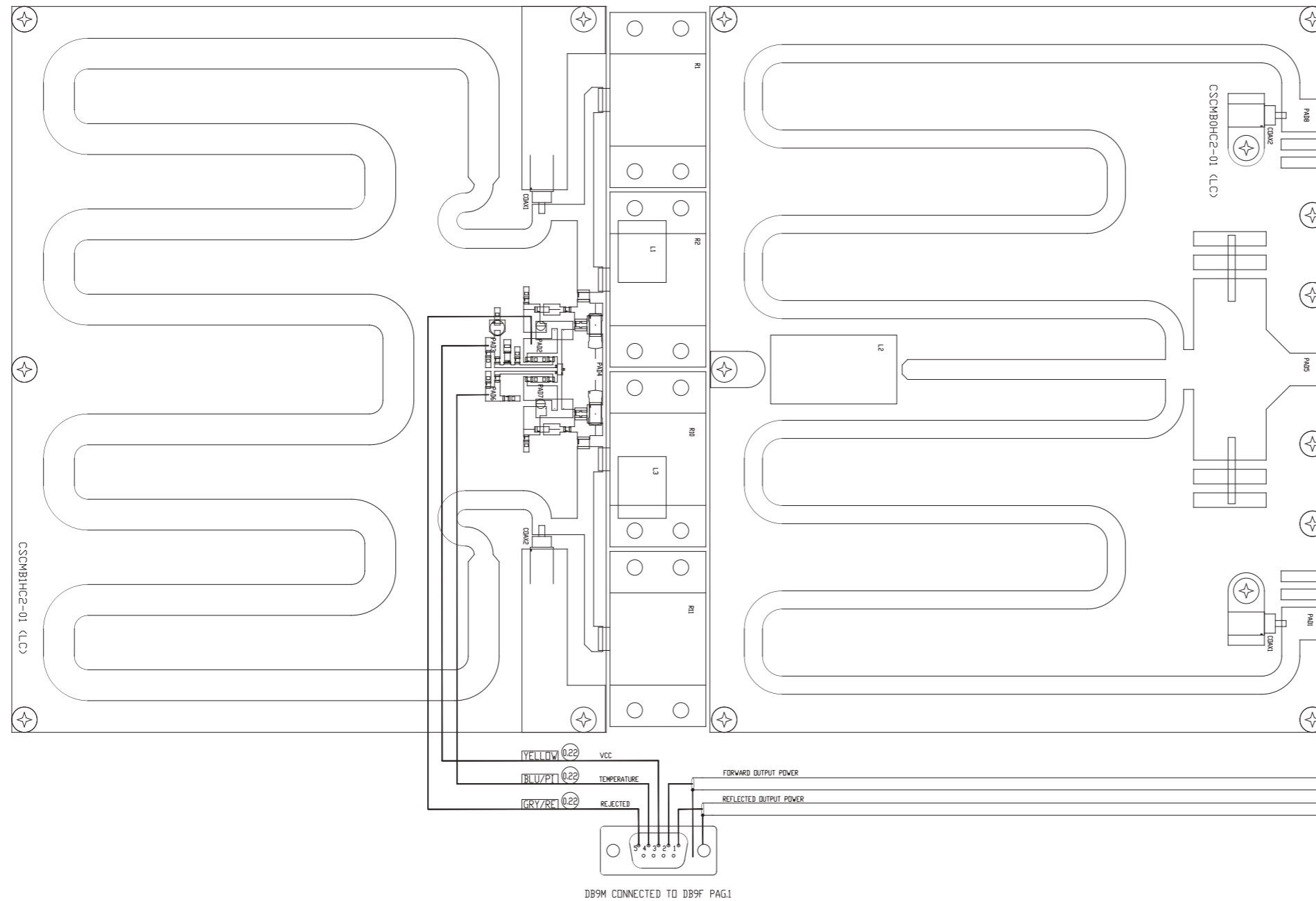
| Date       | Version | Reason        | Code | Editor     |
|------------|---------|---------------|------|------------|
| 29/11/2019 | 1.0     | First Release | /    | J.H. Berti |
|            |         |               |      |            |

KKCAB021A



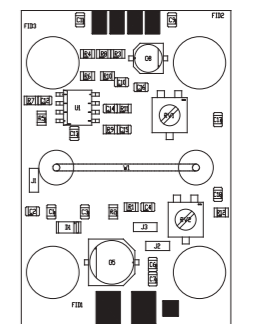
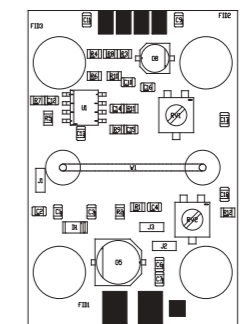
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|--|-----------------------------------|----------------------------|--------------|-----------|---------|
|  | PRODUCT NAME : HC2-GRL            | PART NAME : WIRING DIAGRAM |              |           |         |
|  | DESIGNER : M. UCELLI; G. DE DONNO | DATE 31/07/18              | REVISION 1.3 | SCALE 1:1 | SIZE A3 |
| ARCHIVING : "RVRT" SERVER, "RILASCIATI" FOLDER | PROJECT CODE : 021                | DOCUMENT CODE : KKCAB021A  |              |           |         |

COMBINER SECTION



FORWARD OUT. POWER MEASURE

REFLECTED OUT. POWER MEASURE



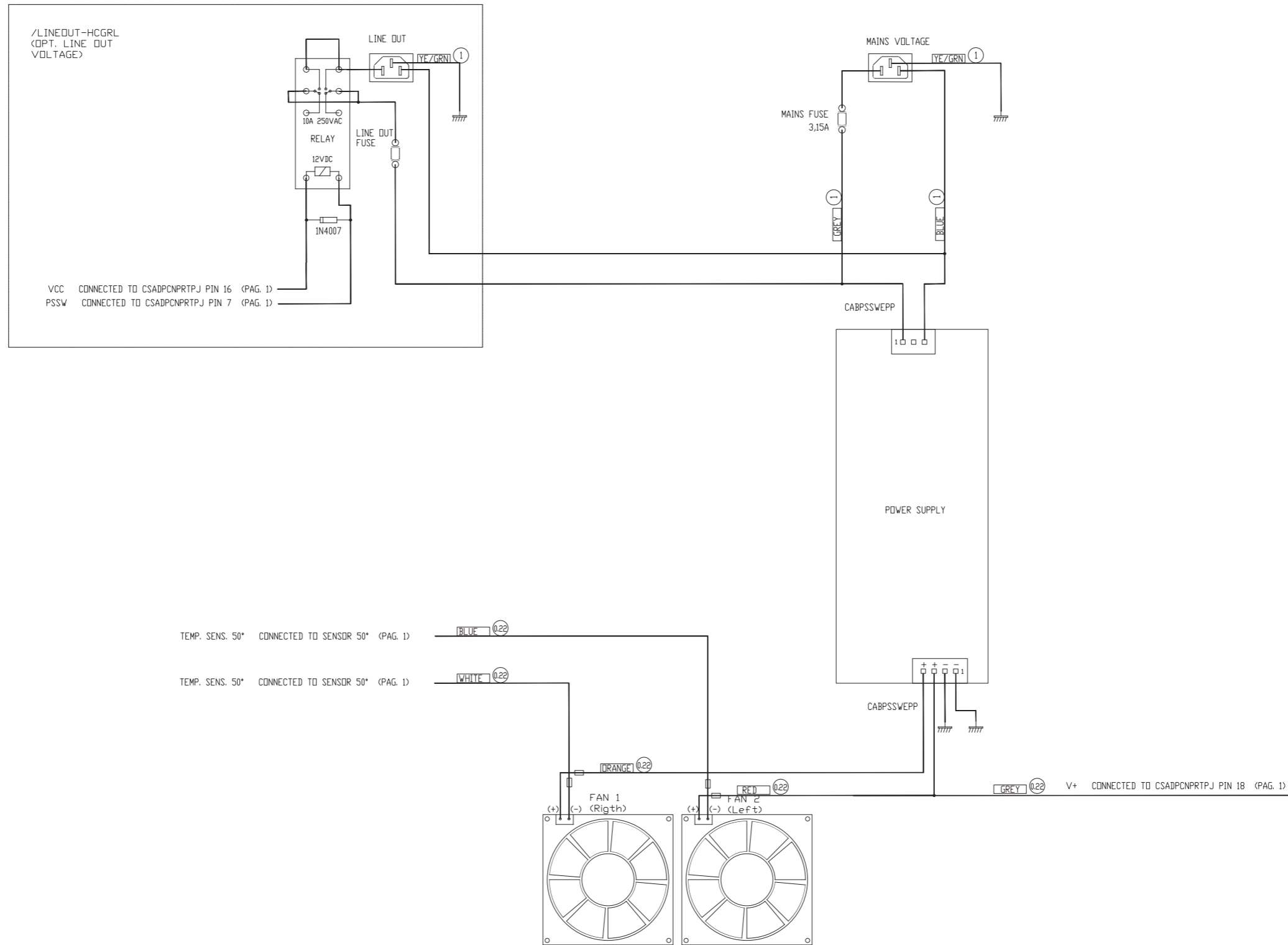
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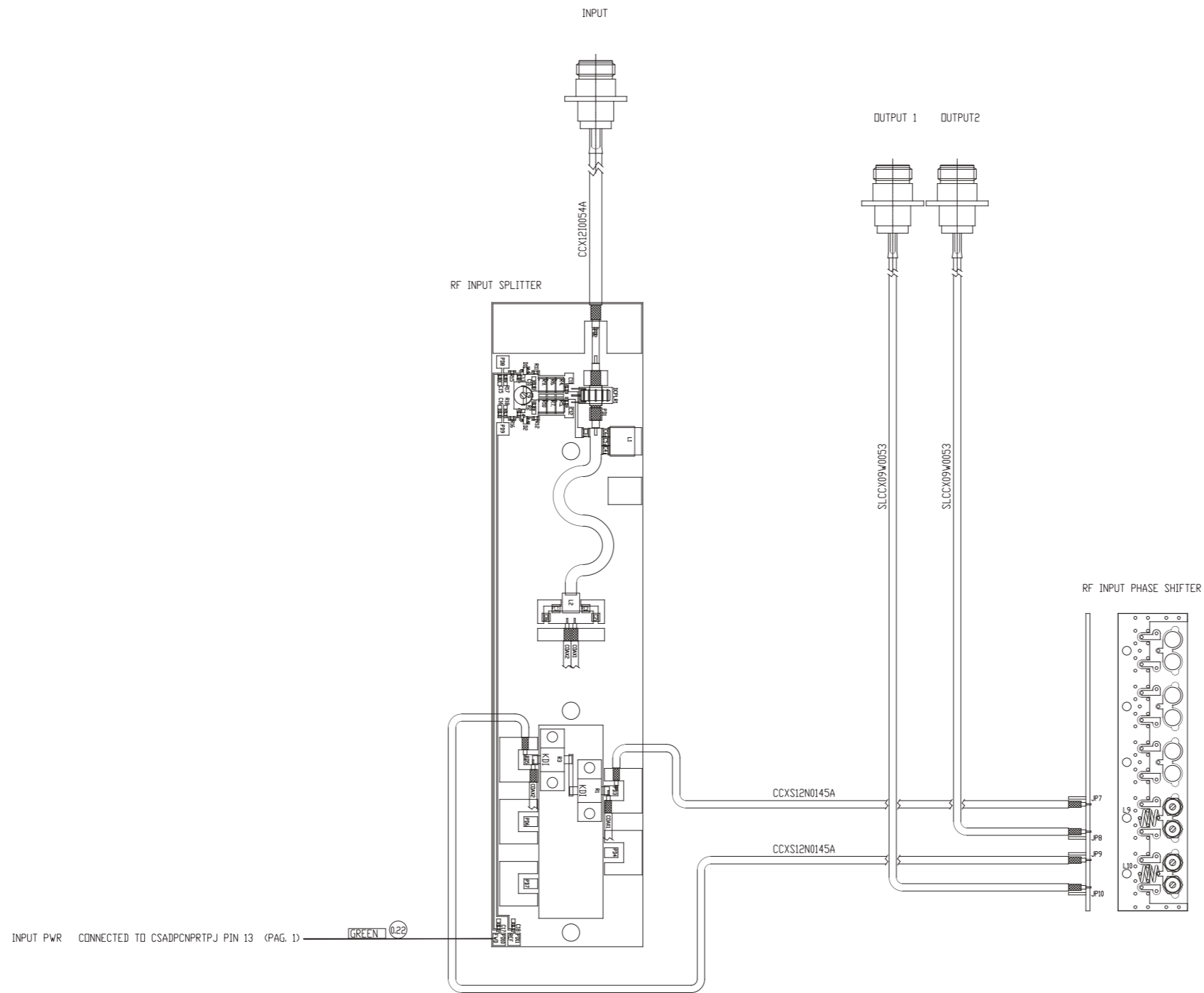


|   |  |
|---|--|
| PRODUCT NAME : HC2-GRL                          | PART NAME : WIRING DIAGRAM   |
| DESIGNER : M. UCELLI; G. DE DONNO               | DATE 31/07/18   REVISION 1.3   SCALE 1:1   SIZE A3   PAGE : 2 DI 5 |
| ARCHIVING : 'RVRUT' SERVER, 'RILASCIATI' FOLDER | PROJECT CODE : 021   DOCUMENT CODE : KKCAB021A                     |

KKCAB021A

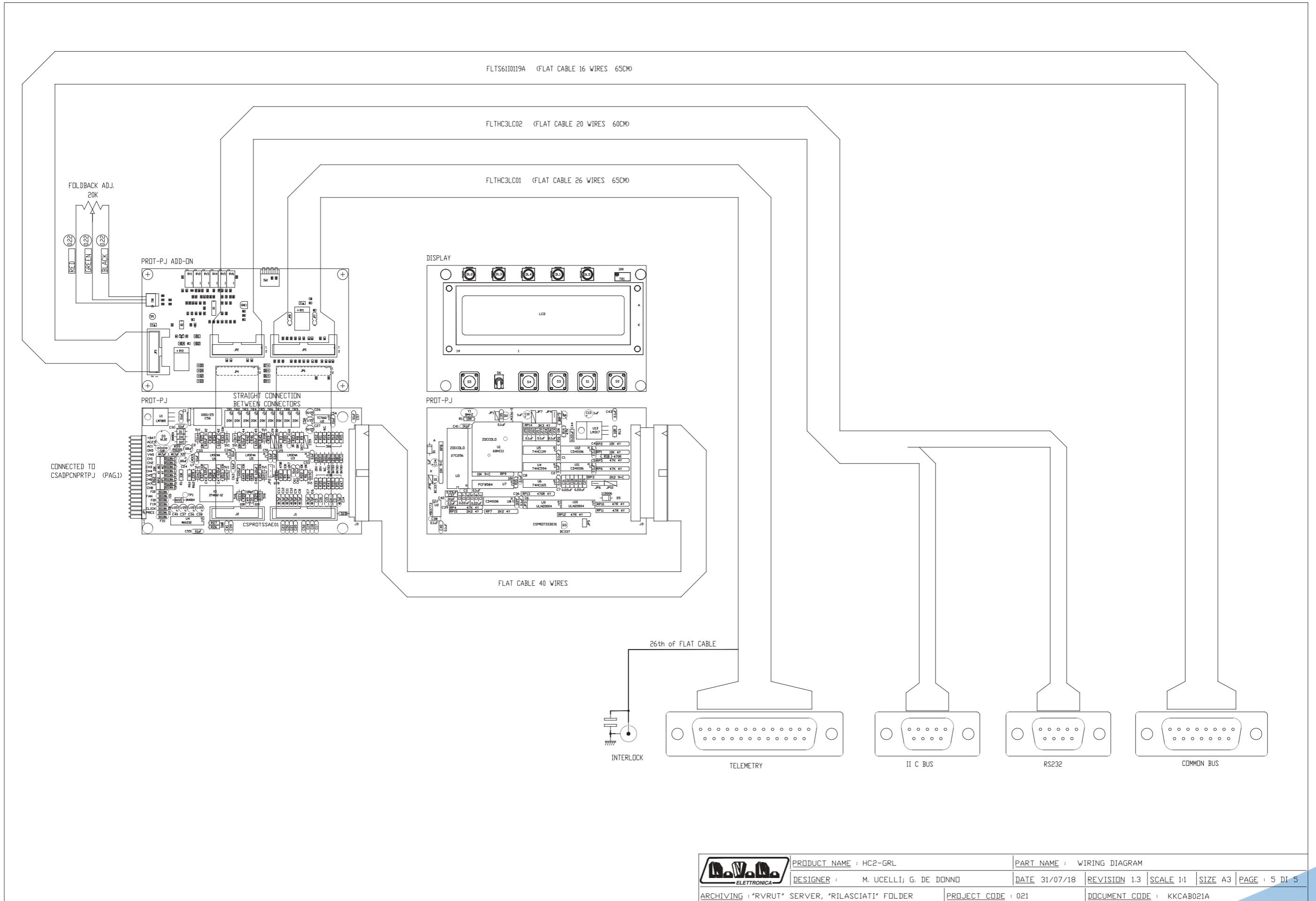


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|---|-----------------------------------|----------------------------|---------------------------|-----------|---------|---------------|
|   | PRODUCT NAME : HC2-GRL            | PART NAME : WIRING DIAGRAM |                           |           |         |               |
|   | DESIGNER : M. UCELLI; G. DE DONNO | DATE 31/07/18              | REVISION 1.3              | SCALE 1:1 | SIZE A3 | PAGE : 3 DI 5 |
| ARCHIVING : 'RVRUT' SERVER, 'RILASCIATI' FOLDER |                                   | PROJECT CODE : 021         | DOCUMENT CODE : KKCAB021A |           |         |               |



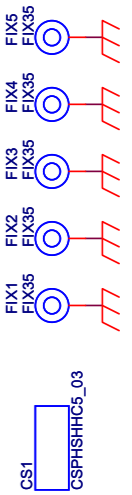
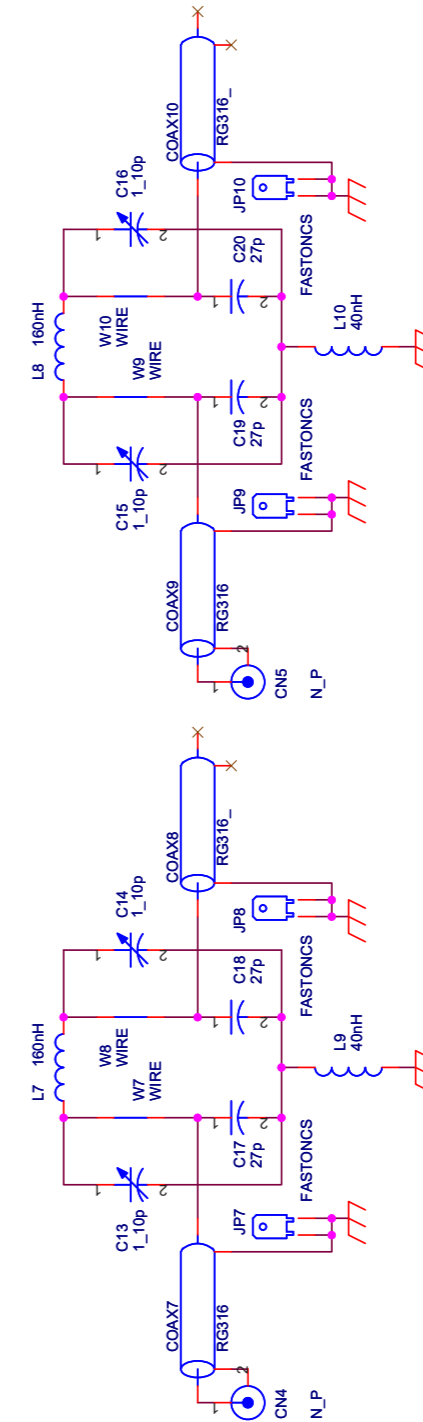
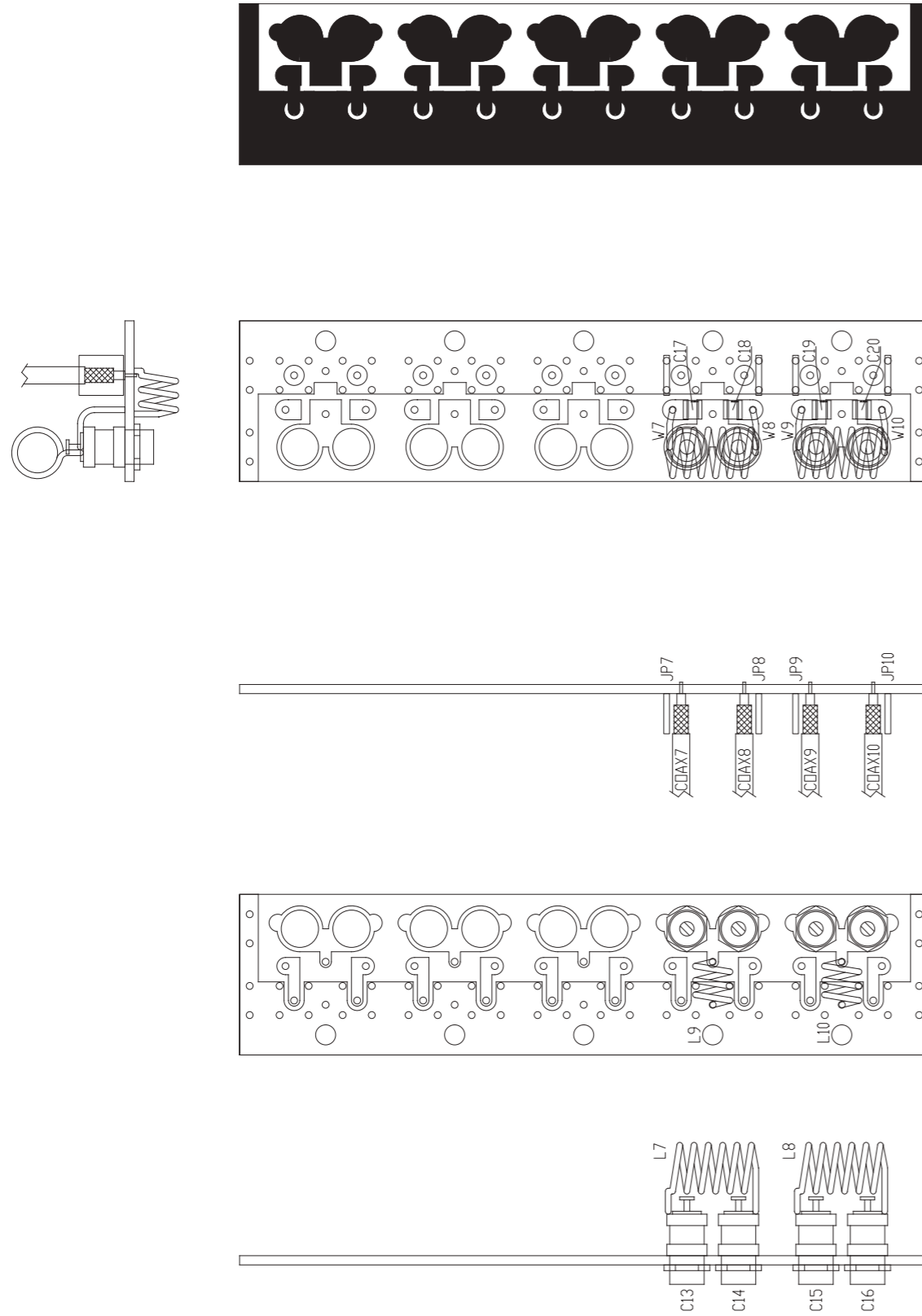
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|---|-----------------------------------|----------------------------|--------------|-----------|---------|
|   | PRODUCT NAME : HC2-GRL            | PART NAME : WIRING DIAGRAM |              |           |         |
|   | DESIGNER : M. UCELLI; G. DE DONNO | DATE 31/07/18              | REVISION 1.3 | SCALE 1:1 | SIZE A3 |
| ARCHIVING : "RVRUT" SERVER, "RILASCIATI" FOLDER | PROJECT CODE : 021                | DOCUMENT CODE : KKCAB021A  |              |           |         |

**KKCAB021A**



|  |                                   |                            |              |           |         |
|--|-----------------------------------|----------------------------|--------------|-----------|---------|
|  | PRODUCT NAME : HC2-GRL            | PART NAME : WIRING DIAGRAM |              |           |         |
|  | DESIGNER : M. UCELLI; G. DE DONNO | DATE 31/07/18              | REVISION 1.3 | SCALE 1:1 | SIZE A3 |
| ARCHIVING : 'RVUT' SERVER, 'RILASCIATI' FOLDER | PROJECT CODE : 021                | DOCUMENT CODE : KKCAB021A  |              |           |         |

SLPHSHHC2-01



|  |          |                  |
|--|----------|------------------|
| Description: Phase Shifter for HC2/LCD |          | Page: 1 of 1     |
| Designer: Ucelli / De Donno            | Size: A4 | Date: 07/06/2013 |
| Part No.: SLPHSHHC2-01                 | Rev: 1.0 |                  |

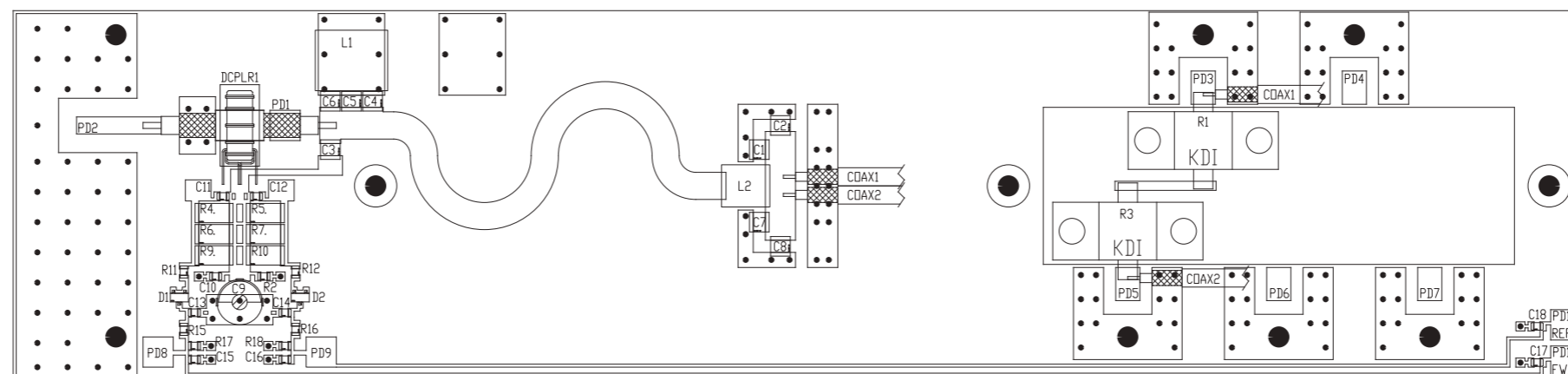
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|---|------------------------------|--------------------------------|----------------|-------------|-----------|---------------|
|   | PRODUCT NAME : HC2/2         | PART NAME : Phase shifter Card |                |             |           |               |
|   | DESIGNER : UCELLI / DE DONNO | DATE : 07/06/13                | REVISION : 1.0 | SCALE : 1:1 | SIZE : A4 | PAGE : 1 DI 1 |
| ARCHIVING : *RVRUT* SERVER, *RILASCIATI* FOLDER | PROJECT CODE : _019          | DOCUMENT CODE : SLPHSHHC2-01   |                |             |           |               |



SLPHSHHC2-01

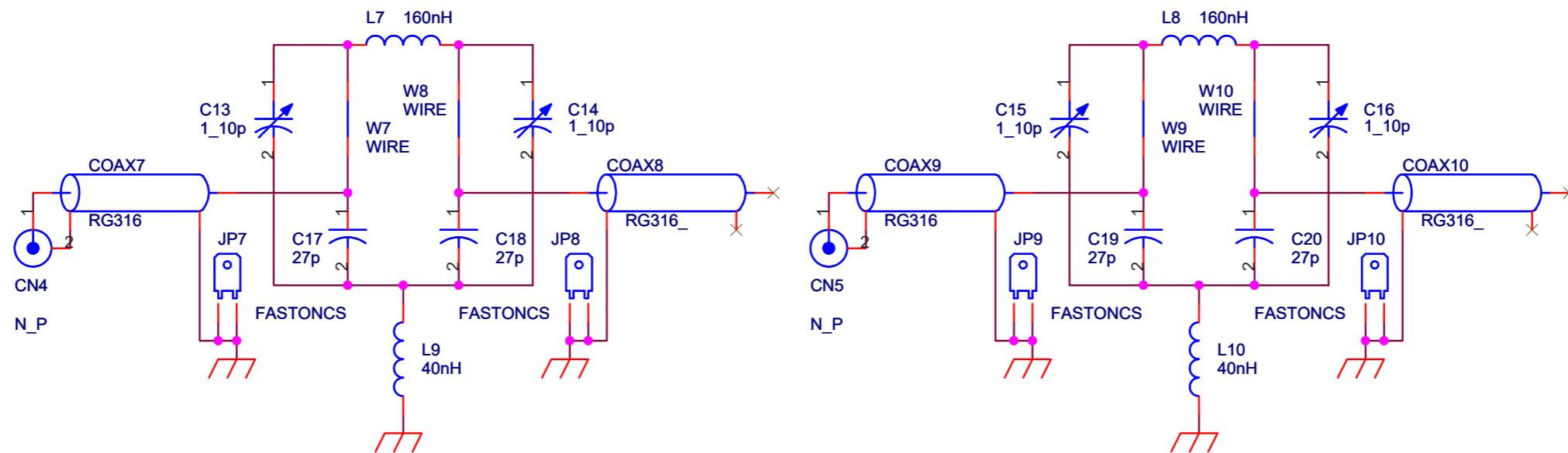
Phase Shifter for HC2/2 LCD  
 SLPHSHHC2-01  
 Revision: 1.0  
 HC2/2  
 Ucelli / De Donno  
 07/06/2013

| Item | Quantity | Reference                | Part         | Description   |
|------|----------|--------------------------|--------------|---|
| 1    | 2        | CN4,CN5                  | N_P          | N panel connector for RG316 cable                                     |
| 2    | 2        | COAX7,COAX9              | RG316        | Coax cable  |
| 3    | 2        | COAX8,COAX10             | RG316        | Coax cable 50H RG316 (595mm)  |
| 4    | 1        | CS1                      | CSPHSHHC5_03 | Printed circuit board   |
| 5    | 4        | C13,C14,C15,C16          | 1_10p        | Air static VAR compensator Tekelec 6mm                                |
| 6    | 4        | C17,C18,C19,C20          | 27p          | SMD capacitor 1212 HQ   |
| 7    | 5        | FIX1,FIX2,FIX3,FIX4,FIX5 | FIX35        | Fixing hole 3.5mm   |
| 8    | 4        | JP7,JP8,JP9,JP10         | FASTONCS     | Printed circuit faston p. 5.08  |
| 9    | 2        | L7,L8                    | 160nH        | Inductor 6 Coils silver plated copper wire D.1 wound on D.7 length 15 |
| 10   | 2        | L9,L10                   | 40nH         | Inductor 3 Coils silver plated copper wire D.1 wound on D.5 length 6  |
| 11   | 4        | W7,W8,W9,W10             | WIRE         | Solder wire   |

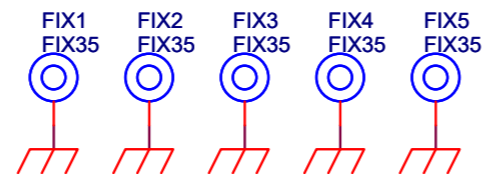


|  |                      |  |
|--|----------------------|--|
|  | PRODUCT NAME : HC2-4 | PART NAME : SPLITTER CARD  |
|  | DESIGNER : M. UCELLI | DATE 19/04/04   REVIS. : 1.0   SCALE 1:1   SIZE A3   PAGE : 1 DI 1 |
| ARCHIVING : 'RVRUT' SERVER, 'RILASCIATI' FOLDER   PROJECT CODE : 017 |                      | DOCUMENT CODE : SLSPLTHC2-01                                       |

SLSPLTHC2-01



CS1  
CSPHSHHC5\_03



|   |                 |                         |
|---|-----------------|-------------------------|
| <b>Description:</b> Phase Shifter for HC2/2 LCD |                 |                         |
| <b>Designer:</b> Ucelli \ De Donno              | <b>Size:</b> A4 | <b>Page:</b> 1 of 1     |
| <b>Part No.:</b> SLPHSHHC2-01                   | <b>Rev.</b> 1.0 | <b>Date:</b> 07/06/2013 |

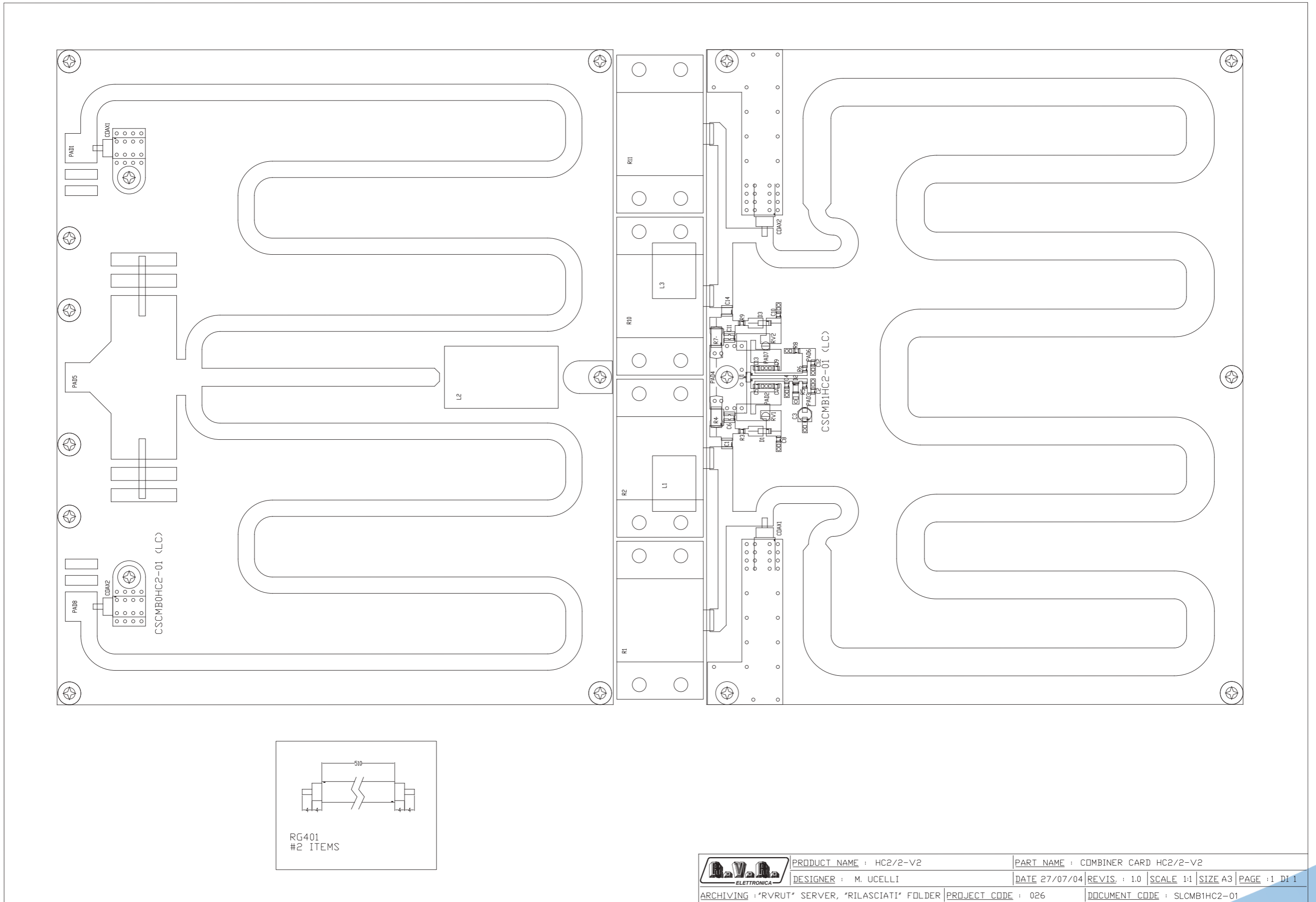


SLSPLTHC2-01

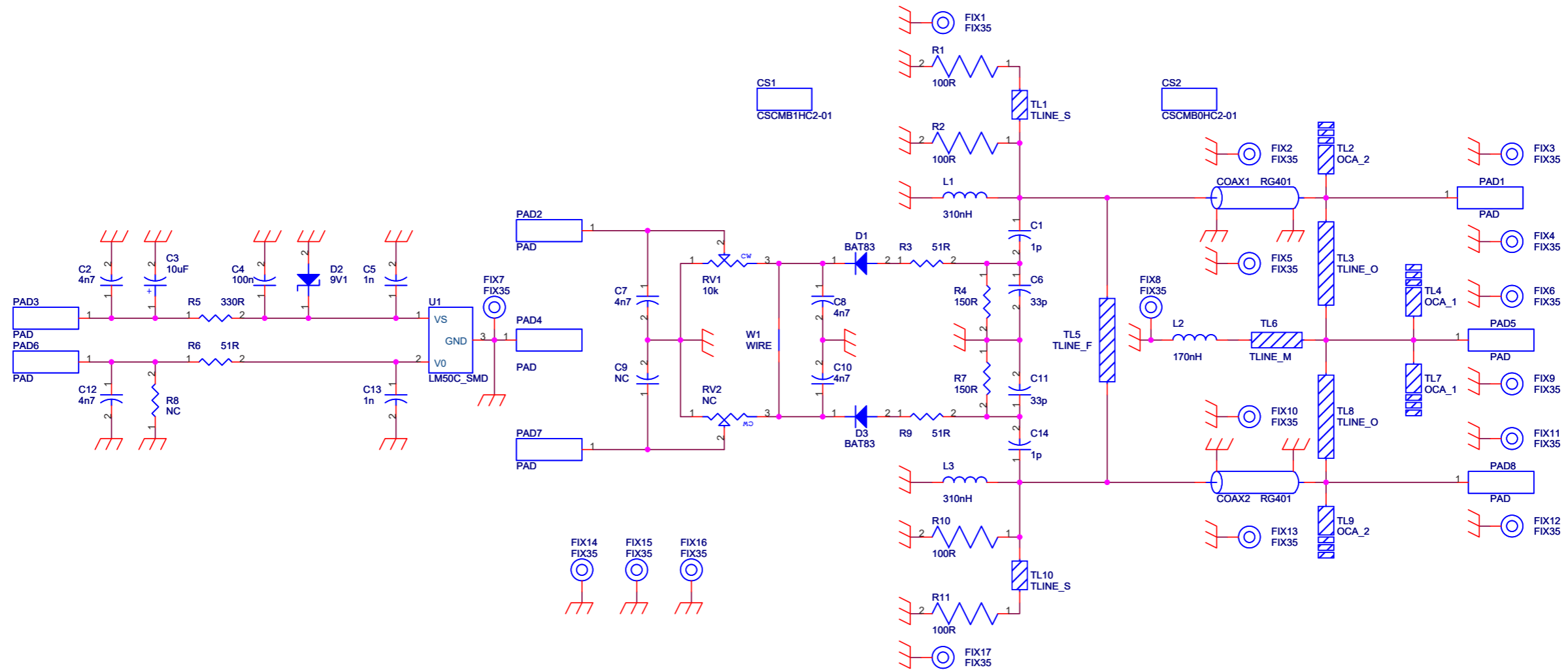
Phase Shifter for HC2/2 LCD  
 SLPHSHHC2-01  
 Revision: 1.0  
 HC2/2  
 Ucelli / De Donno  
 07/06/2013

| Item | Quantity | Reference                | Part         | Description   |
|------|----------|--------------------------|--------------|---|
| 1    | 2        | CN4,CN5                  | N_P          | N panel connector for RG316 cable                                     |
| 2    | 2        | COAX7,COAX9              | RG316        | Coax cable  |
| 3    | 2        | COAX8,COAX10             | RG316_       | Coax cable 50H RG316 (595mm)  |
| 4    | 1        | CS1                      | CSPHSHHC5_03 | Printed circuit board   |
| 5    | 4        | C13,C14,C15,C16          | 1_10p        | Air static VAR compensator Tekelec 6mm                                |
| 6    | 4        | C17,C18,C19,C20          | 27p          | SMD capacitor 1212 HQ   |
| 7    | 5        | FIX1,FIX2,FIX3,FIX4,FIX5 | FIX35        | Fixing hole 3.5mm   |
| 8    | 4        | JP7,JP8,JP9,JP10         | FASTONCS     | Printed circuit faston p. 5.08  |
| 9    | 2        | L7,L8                    | 160nH        | Inductor 6 Coils silver plated copper wire D.1 wound on D.7 length 15 |
| 10   | 2        | L9,L10                   | 40nH         | Inductor 3 Coils silver plated copper wire D.1 wound on D.5 length 6  |
| 11   | 4        | W7,W8,W9,W10             | WIRE         | Solder wire   |

SLCMB1HC2-01



SLCMB1HC2-01



|                                    |          |                |
|------------------------------------|----------|----------------|
| Description: HC2-2 Output Combiner |          |                |
| Designer: Mauro Ucelli             | Size: A3 | Page: 1 of 1   |
| Part No.: SLCMB1HC2-01             | Rev. 1.1 | Date: 22/03/05 |



SLCMB1HC2-01

HC2-2 Output Combiner  
 SLCMB1HC2-01  
 Revision: 1.1  
 HC2/2-V2  
 026  
 Mauro Ucelli  
 22/03/05

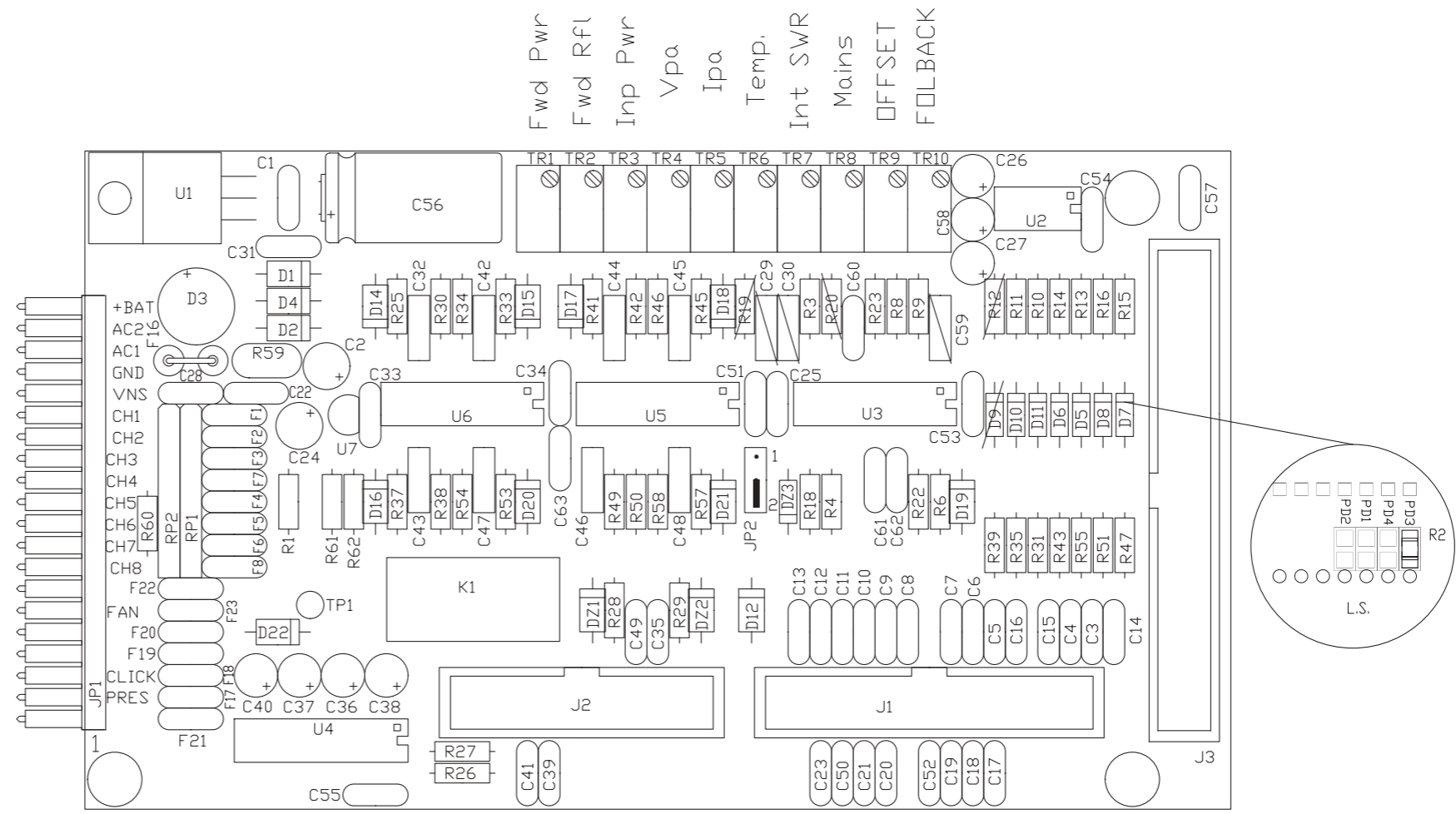
| Item | Quantity | Reference   | Part         | Description                       |
|------|----------|---|--------------|-----------------------------------|
| 1    | 2        | COAX1,COAX2   | RG401        | Coax cable                        |
| 2    | 1        | CS1   | CSCMB1HC2-01 | Printed circuit board             |
| 3    | 1        | CS2   | CSCMB0HC2-01 | Printed circuit board             |
| 4    | 2        | C1,C14  | 1p           | SMD capacitor 1212 HQ             |
| 5    | 5        | C2,C7,C8,C10,C12  | 4n7          | SMD capacitor 0805                |
| 6    | 1        | C3  | 10uF         | SMD electrolytic capacitor d. 5mm |
| 7    | 1        | C4  | 100n         | SMD capacitor 0805                |
| 8    | 2        | C13,C5  | 1n           | SMD capacitor 0805                |
| 9    | 2        | C6,C11  | 33p          | SMD capacitor 1212 HQ             |
| 10   | 1        | C9  | NC           | SMD capacitor 0805                |
| 11   | 2        | D1,D3   | BAT83        | Glass diode DO35                  |
| 12   | 1        | D2  | 9V1          | MINIMELF SMD Zener Diode          |
| 13   | 17       | FIX1, FIX2, FIX3, FIX4, FIX5,<br>FIX6, FIX7, FIX8, FIX9,<br>FIX10, FIX11, FIX12, FIX13,<br>FIX14, FIX15, FIX16, FIX17 | FIX35        | Fixing hole 3.5mm                 |
| 14   | 2        | L1,L3   | 310nH        | Cylindrical inductor              |
| 15   | 1        | L2  | 170nH        | Cylindrical inductor              |
| 16   | 8        | PAD1, PAD2, PAD3, PAD4, PAD5,<br>PAD6, PAD7, PAD8   | PAD          |                                   |
| 17   | 1        | RV1   | 10k          | Trimmer Rg V 3296W                |
| 18   | 1        | RV2   | NC           | Trimmer Rg V 3296W                |
| 19   | 4        | R1,R2,R10,R11   | 100R         | KDI resistor 4 fix                |
| 20   | 3        | R3,R6,R9  | 51R          | SMD resistor 0805                 |
| 21   | 2        | R4,R7   | 150R         | Resistor 2W                       |
| 22   | 1        | R5  | 330R         | SMD resistor 0805                 |
| 23   | 1        | R8  | NC           | SMD resistor 0805                 |
| 24   | 2        | TL10, TL1   | TLINE_S      | Printed circuit strip line        |
| 25   | 2        | TL2, TL9  | OCA_2        | Printed circuit strip line        |
| 26   | 2        | TL3, TL8  | TLINE_O      | Printed circuit strip line        |
| 27   | 2        | TL4, TL7  | OCA_1        | Printed circuit strip line        |
| 28   | 1        | TL5   | TLINE_F      | Printed circuit strip line        |
| 29   | 1        | TL6   | TLINE_M      | Printed circuit strip line        |
| 30   | 1        | U1  | LM50C_SMD    | Temperature sensor                |
| 31   | 1        | W1  | WIRE         | Solder wire                       |

PROTPJ-HCLCD

ARCHIVING : "RVRUT" SERVER, "RILASCIATI" FOLDER | PRODUCT CODE : 014 | PART NAME : Analogic Section Component Layout | DOCUMENT CODE : PROTPJ-HCLCD

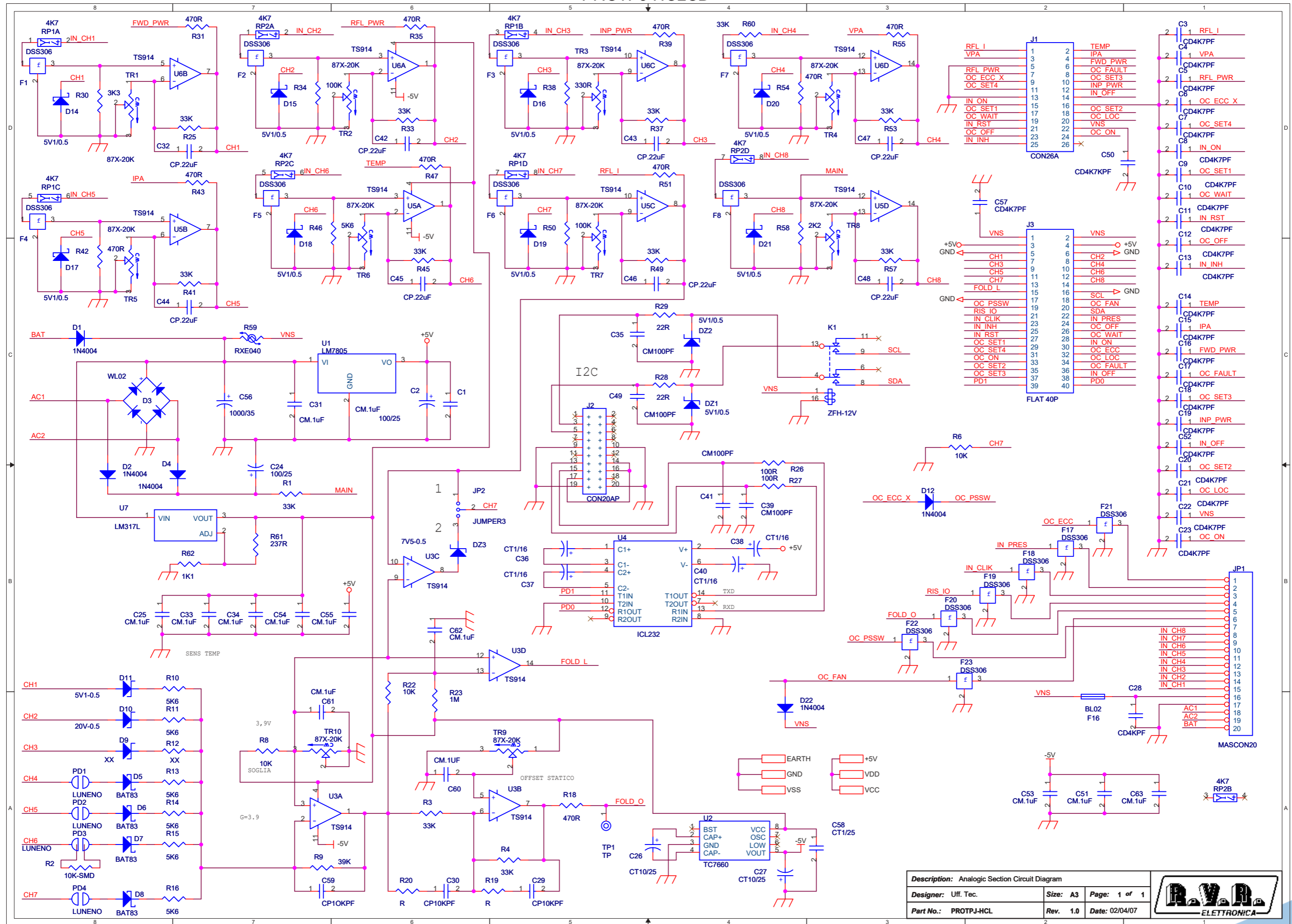
DESIGNER : GP - Rev: J. Berti | DATE : 14/03/07 | REVISION : 3.1 | SCALE : 1:1 | SIZE : A4 | PAGE : 1 DI 1

PRODUCT NAME : HCS-10





**PROTPJ-HCLCD**



|  |                 |                       |
|--|-----------------|-----------------------|
| <b>Description:</b> Analogic Section Circuit Diagram |                 |                       |
| <b>Designer:</b> Uff. Tec.                           | <b>Size:</b> A3 | <b>Page:</b> 1 of 1   |
| <b>Part No.:</b> PROTPJ-HCL                          | <b>Rev.</b> 1.0 | <b>Date:</b> 02/04/07 |



PROTPJ-HCLCD

Revised: Thursday, January 08, 2009  
Revision:

| Item | Quantity | Reference  | Part     |
|------|----------|--|----------|
| 1    | 13       | C1, C25, C31, C33, C34, C51, C53, C54, C55, C60, C61, C62, C63   | CM.1uF   |
| 2    | 2        | C2, C24  | 100/25   |
| 3    | 23       | C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C52, C57 | CD4K7PF  |
| 4    | 2        | C26, C27   | CT10/25  |
| 5    | 1        | C28  | CD4KPF   |
| 6    | 2        | C29, C30   | CP10KPF  |
| 7    | 8        | C32, C42, C43, C44, C45, C46, C47, C48   | CP.22uF  |
| 8    | 4        | C35, C39, C41, C49   | CM100PF  |
| 9    | 4        | C36, C37, C38, C40   | CT1/16   |
| 10   | 1        | C50  | CD4K7KPF |
| 11   | 1        | C56  | 1000/35  |
| 12   | 1        | C58  | CT1/25   |
| 13   | 1        | C59  | CP10KPF  |
| 14   | 10       | DZ1, DZ2, D14, D15, D16, D17, D18, D19, D20, D21   | 5V1/0.5  |
| 15   | 1        | DZ3  | 7V5-0.5  |
| 16   | 5        | D1, D2, D4, D12, D22   | 1N4004   |
| 17   | 1        | D3   | WL02     |
| 18   | 4        | D5, D6, D7, D8   | BAT83    |
| 19   | 2        | D9, R12  | XX       |
| 20   | 1        | D10  | 20V-0.5  |
| 21   | 1        | D11  | 5V1-0.5  |
| 22   | 15       | F1, F2, F3, F4, F5, F6, F7, F8, F17, F18, F19, F20, F21, F22, F23  | DSS306   |
| 23   | 1        | F16  | BL02     |
| 24   | 1        | JP1  | MASCON20 |
| 25   | 1        | JP2  | JUMPER3  |
| 26   | 1        | J1   | CON26A   |
| 27   | 1        | J2   | CON20AP  |
| 28   | 1        | J3   | FLAT 40P |
| 29   | 1        | K1   | ZFH-12V  |
| 30   | 4        | PD1, PD2, PD3, PD4   | LUNENO   |
| 31   | 2        | RP1, RP2   | 4K7      |
| 32   | 12       | R1, R3, R4, R25, R33, R37, R41, R45, R49, R53, R57, R60  | 33K      |
| 33   | 1        | R2   | 10K-SMD  |
| 34   | 3        | R6, R8, R22  | 10K      |
| 35   | 1        | R9   | 39K      |
| 36   | 7        | R10, R11, R13, R14, R15, R16, R46  | 5K6      |
| 37   | 10       | R18, R31, R35, R39, R42, R43, R47, R51, R54, R55   | 470R     |
| 38   | 2        | R19, R20   | R        |
| 39   | 1        | R23  | 1M       |
| 40   | 2        | R26, R27   | 100R     |
| 41   | 2        | R28, R29   | 22R      |
| 42   | 1        | R30  | 3K3      |
| 43   | 2        | R34, R50   | 100K     |
| 44   | 1        | R38  | 330R     |
| 45   | 1        | R58  | 2K2      |
| 46   | 1        | R59  | RXE040   |
| 47   | 1        | R61  | 237R     |
| 48   | 1        | R62  | 1K1      |
| 49   | 1        | TP1  | TP       |
| 50   | 10       | TR1, TR2, TR3, TR4, TR5, TR6, TR7, TR8, TR9, TR10  | 87X-20K  |
| 51   | 1        | U1   | LM7805   |
| 52   | 1        | U2   | TC7660   |
| 53   | 3        | U3, U5, U6   | TS914    |
| 54   | 1        | U4   | ICL232   |
| 55   | 1        | U7   | LM317L   |

Revised: Thursday, January 08, 2009  
Revision:

| Item | Quantity | Reference  | Part     |
|------|----------|--|----------|
| 1    | 13       | C1, C25, C31, C33, C34, C51, C53, C54, C55, C60, C61, C62, C63   | CM.1uF   |
| 2    | 2        | C2, C24  | 100/25   |
| 3    | 23       | C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C52, C57 | CD4K7PF  |
| 4    | 2        | C26, C27   | CT10/25  |
| 5    | 1        | C28  | CD4KPF   |
| 6    | 2        | C29, C30   | CP10KPF  |
| 7    | 8        | C32, C42, C43, C44, C45, C46, C47, C48   | CP.22uF  |
| 8    | 4        | C35, C39, C41, C49   | CM100PF  |
| 9    | 4        | C36, C37, C38, C40   | CT1/16   |
| 10   | 1        | C50  | CD4K7KPF |
| 11   | 1        | C56  | 1000/35  |
| 12   | 1        | C58  | CT1/25   |
| 13   | 1        | C59  | CP10KPF  |
| 14   | 10       | DZ1, DZ2, D14, D15, D16, D17, D18, D19, D20, D21   | 5V1/0.5  |
| 15   | 1        | DZ3  | 7V5-0.5  |
| 16   | 5        | D1, D2, D4, D12, D22   | 1N4004   |
| 17   | 1        | D3   | WL02     |
| 18   | 4        | D5, D6, D7, D8   | BAT83    |
| 19   | 2        | D9, R12  | XX       |
| 20   | 1        | D10  | 20V-0.5  |
| 21   | 1        | D11  | 5V1-0.5  |
| 22   | 15       | F1, F2, F3, F4, F5, F6, F7, F8, F17, F18, F19, F20, F21, F22, F23  | DSS306   |
| 23   | 1        | F16  | BL02     |
| 24   | 1        | JP1  | MASCON20 |
| 25   | 1        | JP2  | JUMPER3  |
| 26   | 1        | J1   | CON26A   |
| 27   | 1        | J2   | CON20AP  |
| 28   | 1        | J3   | FLAT 40P |
| 29   | 1        | K1   | ZFH-12V  |
| 30   | 4        | PD1, PD2, PD3, PD4   | LUNENO   |
| 31   | 2        | RP1, RP2   | 4K7      |
| 32   | 12       | R1, R3, R4, R25, R33, R37, R41, R45, R49, R53, R57, R60  | 33K      |
| 33   | 1        | R2   | 10K-SMD  |
| 34   | 3        | R6, R8, R22  | 10K      |
| 35   | 1        | R9   | 39K      |
| 36   | 7        | R10, R11, R13, R14, R15, R16, R46  | 5K6      |
| 37   | 10       | R18, R31, R35, R39, R42, R43, R47, R51, R54, R55   | 470R     |
| 38   | 2        | R19, R20   | R        |
| 39   | 1        | R23  | 1M       |
| 40   | 2        | R26, R27   | 100R     |
| 41   | 2        | R28, R29   | 22R      |
| 42   | 1        | R30  | 3K3      |
| 43   | 2        | R34, R50   | 100K     |
| 44   | 1        | R38  | 330R     |
| 45   | 1        | R58  | 2K2      |
| 46   | 1        | R59  | RXE040   |
| 47   | 1        | R61  | 237R     |
| 48   | 1        | R62  | 1K1      |
| 49   | 1        | TP1  | TP       |
| 50   | 10       | TR1, TR2, TR3, TR4, TR5, TR6, TR7, TR8, TR9, TR10  | 87X-20K  |
| 51   | 1        | U1   | LM7805   |
| 52   | 1        | U2   | TC7660   |
| 53   | 3        | U3, U5, U6   | TS914    |
| 54   | 1        | U4   | ICL232   |
| 55   | 1        | U7   | LM317L   |

PROTPJ-HCLCD

ARCHIVING : "RVVUT" SERVER, "RILASCIATI" FOLDER

PRODUCT NAME : HCS-10

DESIGNER : GP - Rev: J. Berti

PART NAME : LCD Alarms Card Layout

DATE : 30/10/08

REVISION : 1.1

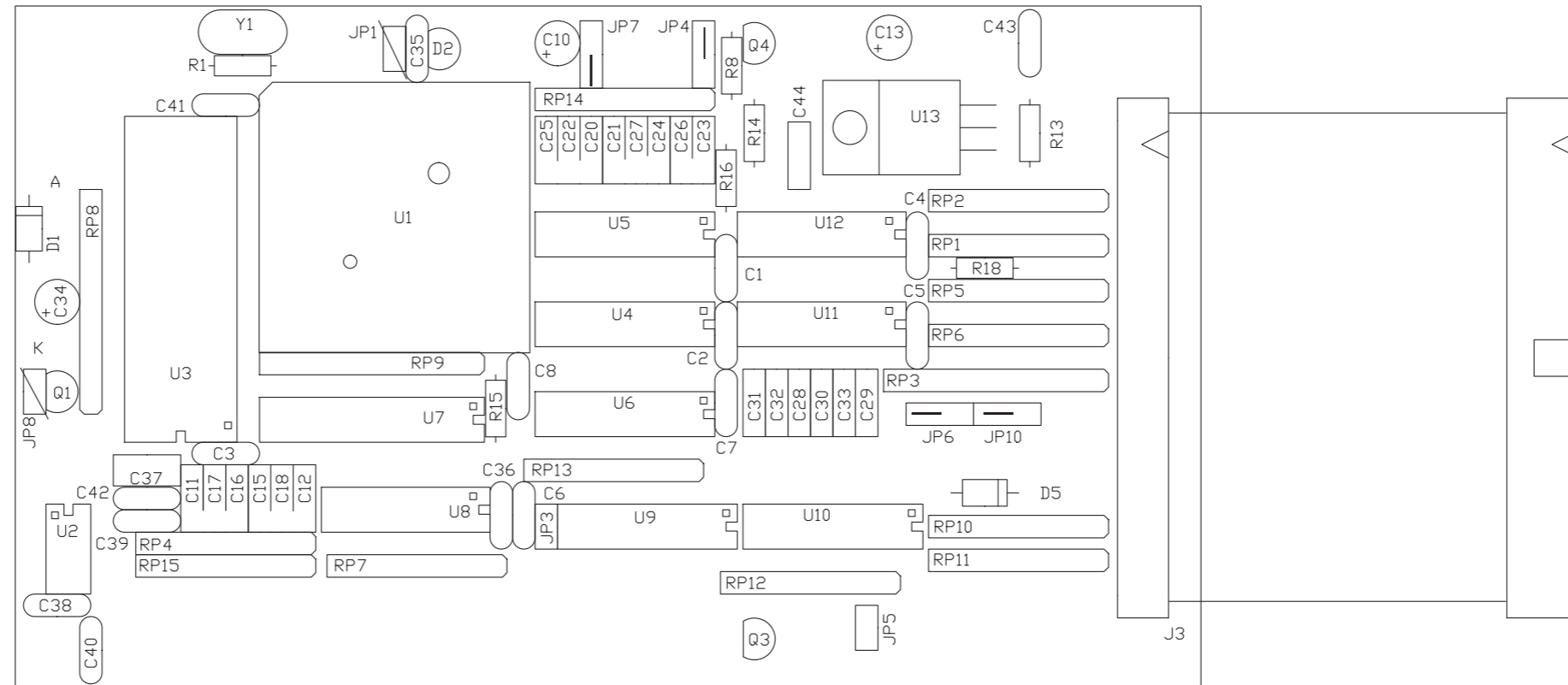
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SIZE : A4

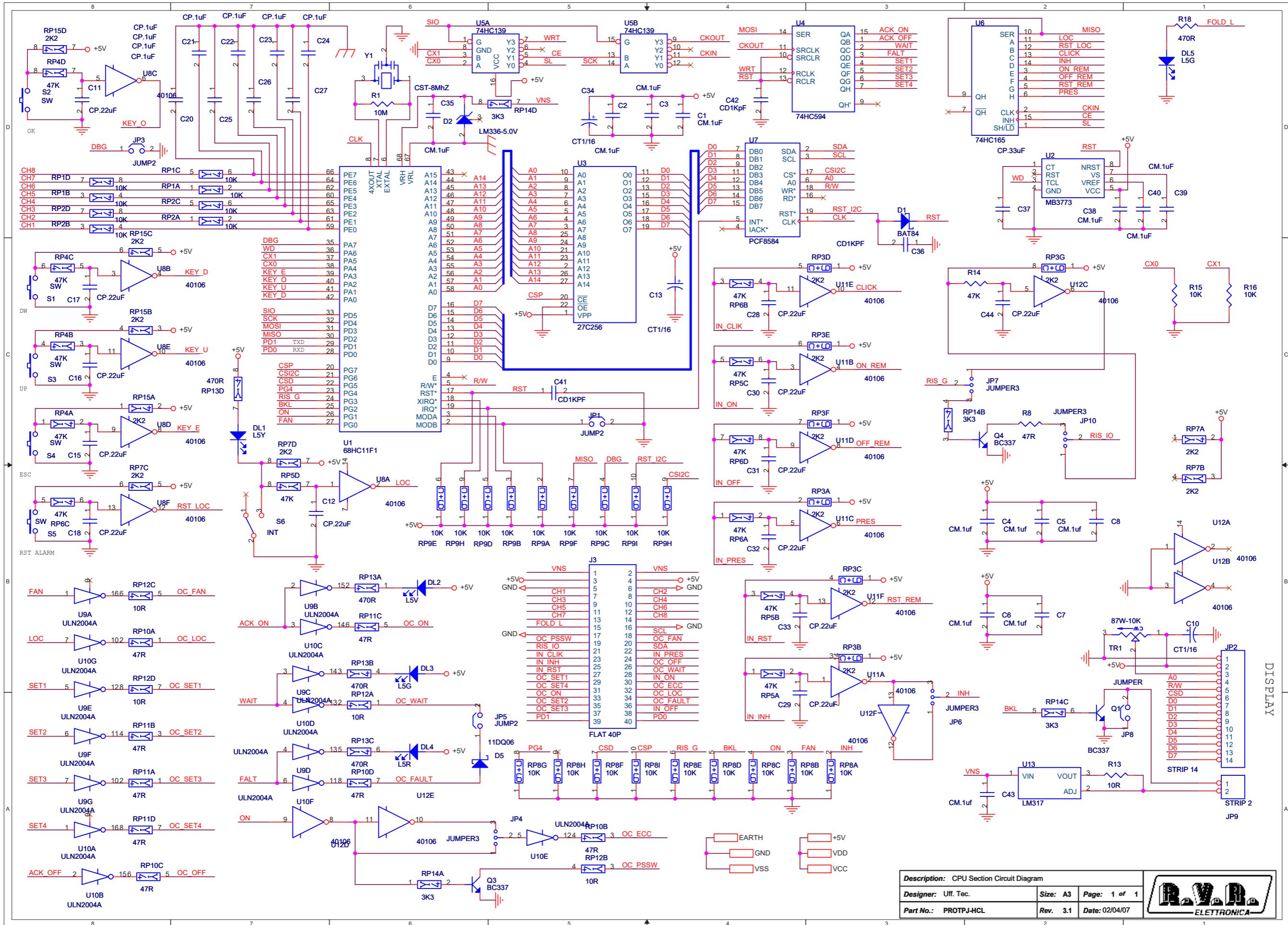
PAGE : 1 DI 1

PROJECT CODE : 014

DOCUMENT CODE : PROTPJ-HCLCD



PROTPJ-HCLCD



|  |          |                |
|--|----------|----------------|
| Description: CPU Section Circuit Diagram |          |                |
| Designer: Uff. Tec.                      | Size: A3 | Page: 1 of 1   |
| Part No.: PROTPJ-HCL                     | Rev. 3.1 | Date: 02/04/07 |



PROTPJ-HCLCD

Revised: Thursday, January 08, 2009  
Revision:

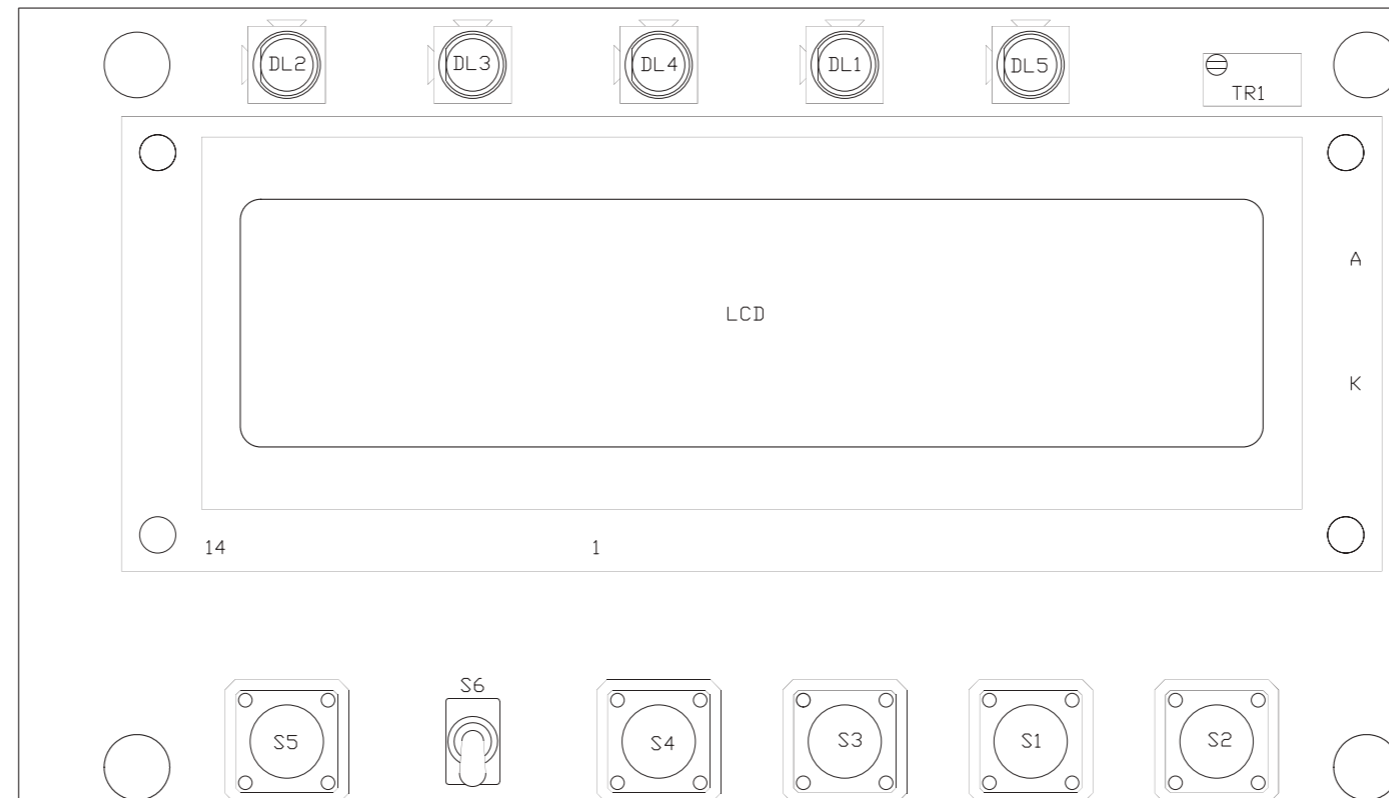
| Item | Quantity | Reference   | Part       |
|------|----------|---|------------|
| 1    | 13       | C1, C2, C3, C4, C5, C6, C7, C8, C35, C38, C39, C40, C43         | CM.1uf     |
| 2    | 3        | C10, C13, C34   | CT1/16     |
| 3    | 13       | C11, C12, C15, C16, C17, C18, C28, C29, C30, C31, C32, C33, C44 | CP.22uF    |
| 4    | 8        | C20, C21, C22, C23, C24, C25, C26, C27                          | CP.1uF     |
| 5    | 3        | C36, C41, C42   | CD1KpF     |
| 6    | 1        | C37   | CP.33uF    |
| 7    | 1        | DL1   | L5Y        |
| 8    | 1        | DL2   | L5V        |
| 9    | 2        | DL3, DL5  | L5G        |
| 10   | 1        | DL4   | L5R        |
| 11   | 1        | D1  | BAT84      |
| 12   | 1        | D2  | LM336-5.0V |
| 13   | 1        | D5  | 11DQ06     |
| 14   | 3        | JP1, JP3, JP5   | JUMP2      |
| 15   | 1        | JP2   | STRIP 14   |
| 16   | 4        | JP4, JP6, JP7, JP10   | JUMPER3    |
| 17   | 1        | JP8   | JUMPER     |
| 18   | 1        | JP9   | STRIP 2    |
| 19   | 1        | J3  | FLAT 40P   |
| 20   | 3        | Q1, Q3, Q4  | BC337      |
| 21   | 6        | RP1, RP2, RP8, RP9, R15, R16                                    | 10K        |
| 22   | 3        | RP3, RP7, RP15  | 2K2        |
| 23   | 4        | RP4, RP5, RP6, R14  | 47K        |
| 24   | 3        | R8, RP10, RP11  | 47R        |
| 25   | 2        | RP12, R13   | 10R        |
| 26   | 2        | RP13, R18   | 470R       |
| 27   | 1        | RP14  | 3K3        |
| 28   | 1        | R1  | 10M        |
| 29   | 5        | S1, S2, S3, S4, S5  | SW         |
| 30   | 1        | S6  | INT        |
| 31   | 1        | TR1   | 87W-10K    |
| 32   | 1        | U1  | 68HC11F1   |
| 33   | 1        | U2  | MB3773     |
| 34   | 1        | U3  | 27C256     |
| 35   | 1        | U4  | 74HC594    |
| 36   | 1        | U5  | 74HC139    |
| 37   | 1        | U6  | 74HC165    |
| 38   | 1        | U7  | PCF8584    |
| 39   | 3        | U8, U11, U12  | 40106      |
| 40   | 2        | U9, U10   | ULN2004A   |
| 41   | 1        | U13   | LM317      |
| 42   | 1        | Y1  | CST-8MhZ   |

PROTPJ-HCLCD

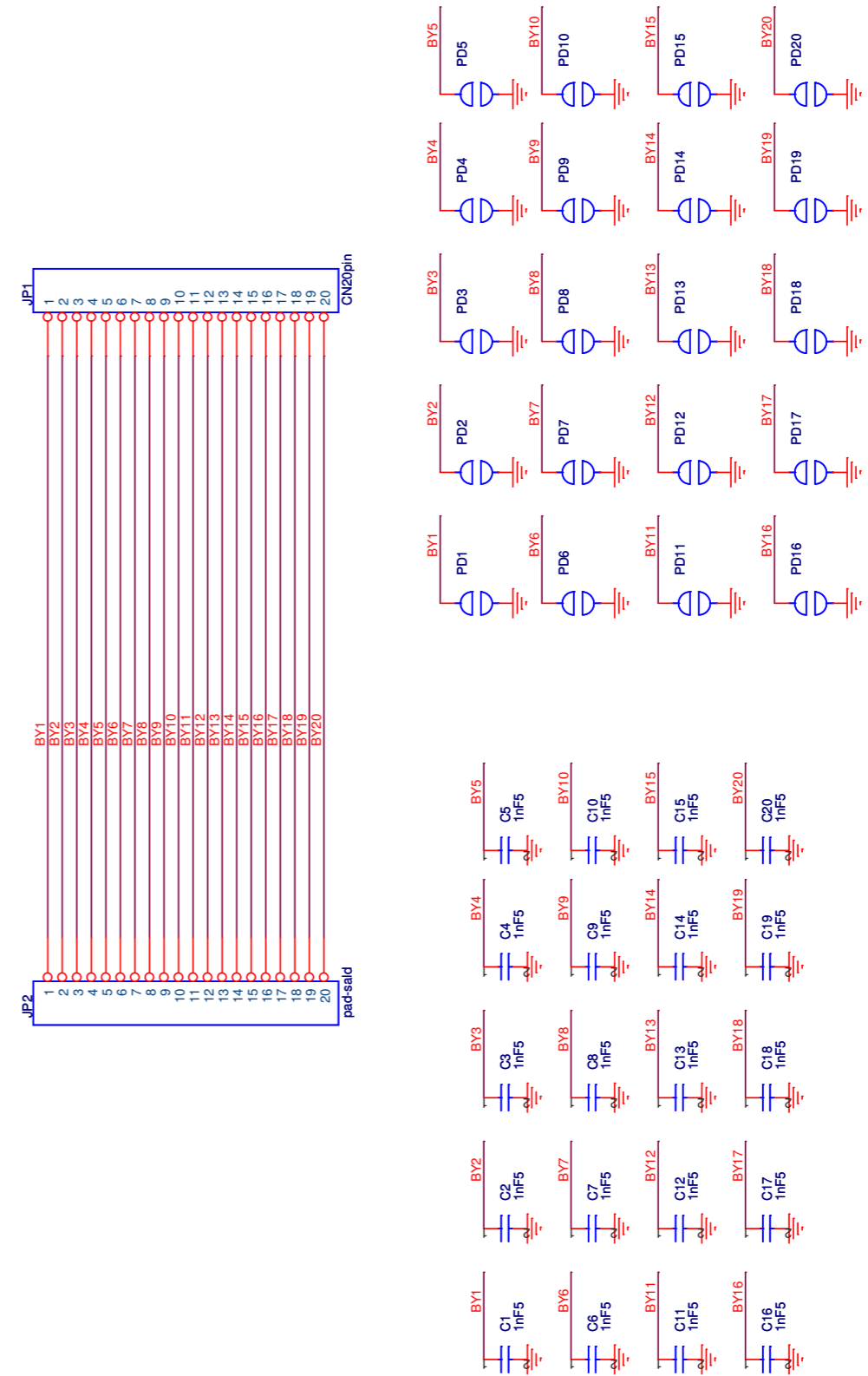
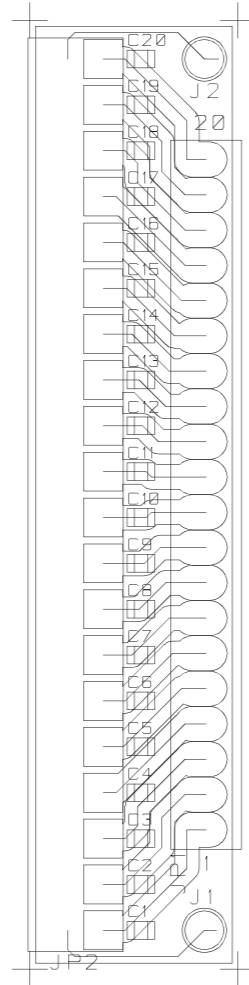
ARCHIVING : 'RVPUT' SERVER, 'RILASCIATI' FOLDER | PROJECT CODE : 014 | DOCUMENT CODE : PROTPJ-HCLCD

PRODUCT NAME : HCS-10 | PART NAME : CPU Display Section Component Layout

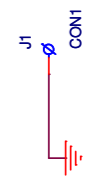
DESIGNER : GP - Rev.: J. Berti | DATE : 11/02/04 | REVISION : 2.0 | SCALE : 1:1 | SIZE : A4 | PAGE : 1 DI 1



SLADPCNPRTPJ



CS1  
CSADPCNPRTPJ



|                               |                  |
|-------------------------------|------------------|
| Description: CPU Adapter card |                  |
| Designer: UT                  | Page: 1 of 1     |
| Size: A4                      | Rev. 2.1         |
| Part No.: SLADPCNPRTPJ        | Date: 11/03/2005 |

|   |                        |                              |                |             |           |
|---|------------------------|------------------------------|----------------|-------------|-----------|
|   | PRODUCT NAME : PJ / HC | PART NAME : CPU Adapter card |                |             |           |
|   | DESIGNER : UT          | DATE : 11/03/05              | REVISION : 2.1 | SCALE : 1:1 | SIZE : A4 |
| ARCHIVING : *RVRUT* SERVER, *RILASCIATI* FOLDER | PROJECT CODE : <>      | DOCUMENT CODE : SLADPCNPRTPJ |                |             |           |

SLADPCNPRTPJ

CPU Adapter card Revised: Friday, March 11, 2005  
 SLADPCNPRTPJ Revision: 2.1  
 UT

| Item | Quantity | Reference   | Part         | Description                            |
|------|----------|---|--------------|--|
| 1    | 1        | CS1   | CSADPCNPRTPJ | Printed circuit board                  |
| 2    | 20       | C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20                     | 1nF5         | Ceramic capacitor 0805 X7R             |
| 3    | 1        | JP1   | CN20pin      | stripped female connector 20pin turned |
| 4    | 1        | JP2   | pad-sald     | Solder pad                             |
| 5    | 1        | J1  | CON1         | Solder pad                             |
| 6    | 20       | PD1, PD2, PD3, PD4, PD5, PD6, PD7, PD8, PD9, PD10, PD11, PD12, PD13, PD14, PD15, PD16, PD17, PD18, PD19, PD20 |              | Solder pad                             |





100W Single Output with PFC Function

**EPP-100 series**



- Features :
  - 4"x2" Compact size
  - Universal AC input / Full range
  - Built-in active PFC function
  - High efficiency up to 92.5%
  - Protections: Short circuit / Overload / Over voltage/Over temperature
  - 75W free air convection, 100W with 20CFM forced air
  - LED indicator for power on
  - No load power consumption<0.5W
  - Built-in 12V/0.3A auxiliary output
  - 3 years warranty



**SPECIFICATION**

| MODEL                 | EPP-100-12                   | EPP-100-15  | EPP-100-24                       | EPP-100-27                  | EPP-100-48     |               |
|-----------------------|------------------------------|---|----------------------------------|-----------------------------|----------------|---------------|
| OUTPUT                | DC VOLTAGE                   | 12V   | 15V                              | 24V                         | 27V            | 48V           |
|                       | RATED CURRENT (convection)   | 6.3A  | 5A                               | 3.2A                        | 2.8A           | 1.6A          |
|                       | RATED CURRENT (20CFM FAN)    | 8.5A  | 6.67A                            | 4.2A                        | 3.71A          | 2.1A          |
|                       | CURRENT RANGE (convection)   | 0 ~ 6.3A  | 0 ~ 5A                           | 0 ~ 3.2A                    | 0 ~ 2.8A       | 0 ~ 1.6A      |
|                       | CURRENT RANGE (20CFM FAN)    | 0 ~ 8.5A  | 0 ~ 6.67A                        | 0 ~ 4.2A                    | 0 ~ 3.71A      | 0 ~ 2.1A      |
|                       | RATED POWER (convection)     | 75.6W   | 75W                              | 76.8W                       | 75.6W          | 76.8W         |
|                       | RATED POWER (20CFM FAN)      | 102W  | 100.05W                          | 100.8W                      | 100.17W        | 100.8W        |
|                       | RIPPLE & NOISE (max.) Note.2 | 120mVp-p  | 150mVp-p                         | 240mVp-p                    | 240mVp-p       | 300mVp-p      |
|                       | VOLTAGE ADJ. RANGE           | 11.76 ~ 12.6V   | 14.7 ~ 15.75V                    | 23.52 ~ 25.2V               | 26.46 ~ 28.35V | 47.04 ~ 50.4V |
|                       | VOLTAGE TOLERANCE Note.3     | ±2.0%   | ±2.0%                            | ±1.0%                       | ±1.0%          | ±1.0%         |
| LINE REGULATION       | ±0.5%                        | ±0.5%   | ±0.5%                            | ±0.5%                       | ±0.5%          |               |
| LOAD REGULATION       | ±1.0%                        | ±1.0%   | ±1.0%                            | ±1.0%                       | ±1.0%          |               |
| SETUP, RISE TIME      | 1000ms, 30ms/230VAC          |   | 2000ms, 30ms/115VAC at full load |                             |                |               |
| HOLD UP TIME (Typ.)   | 16ms/230VAC                  | 16ms/115VAC at full load  |                                  |                             |                |               |
| INPUT                 | VOLTAGE RANGE Note.5         | 90 ~ 264VAC   | 127 ~ 370VDC                     |                             |                |               |
|                       | FREQUENCY RANGE              | 47 ~ 63Hz   |                                  |                             |                |               |
|                       | POWER FACTOR (Typ.)          | PF>0.95/230VAC  |                                  | PF>0.98/115VAC at full load |                |               |
|                       | EFFICIENCY (Typ.)            | 91%   | 91%                              | 92%                         | 92.5%          | 92.5%         |
|                       | AC CURRENT (Typ.)            | 1.4A/115VAC   |                                  | 0.7A/230VAC                 |                |               |
|                       | INRUSH CURRENT (Typ.)        | COLD START 70A/230VAC   |                                  |                             |                |               |
|                       | LEAKAGE CURRENT              | <2mA/240VAC   |                                  |                             |                |               |
| PROTECTION            | OVER LOAD                    | 105 ~ 145% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed |                                  |                             |                |               |
|                       | OVER VOLTAGE                 | 13.2 ~ 15.6V  | 16.83 ~ 19.5V                    | 27.7 ~ 31.5V                | 30.2 ~ 34.05V  | 51.3 ~ 62.7V  |
|                       | OVER TEMPERATURE             | 110°C ± 10°C (RTH2), 110°C ± 5°C (TSW2)<br>Protection type : Shut down o/p voltage, re-power on to recover              |                                  |                             |                |               |
| FUNCTION              | AUXILIARY POWER(AUX)         | 12V@0.3A for driving a fan, tolerance ± 10% at main output 100% load  |                                  |                             |                |               |
|                       | WORKING TEMP.                | -30 ~ +70°C (Refer to "Derating Curve")   |                                  |                             |                |               |
| ENVIRONMENT           | WORKING HUMIDITY             | 20 ~ 90% RH non-condensing  |                                  |                             |                |               |
|                       | STORAGE TEMP., HUMIDITY      | -40 ~ +85°C, 10 ~ 95% RH  |                                  |                             |                |               |
|                       | TEMP. COEFFICIENT            | ±0.03%/°C (0 ~ 45°C)  |                                  |                             |                |               |
|                       | VIBRATION                    | 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes   |                                  |                             |                |               |
| SAFETY & EMC (Note 4) | SAFETY STANDARDS             | UL60950-1, TUV EN60950-1 approved   |                                  |                             |                |               |
|                       | WITHSTAND VOLTAGE            | I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC   |                                  |                             |                |               |
|                       | ISOLATION RESISTANCE         | I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 500VDC / 25°C / 70% RH   |                                  |                             |                |               |
|                       | EMC EMISSION                 | Compliance to EN55022 (CISPR22) Class B, EN61000-3-2,-3   |                                  |                             |                |               |
| OTHERS                | EMC IMMUNITY                 | Compliance to EN61000-4-2,3,4,5,6,8,11, heavy industry level, criteria A  |                                  |                             |                |               |
|                       | MTBF                         | 249.6Khrs min. MIL-HDBK-217F (25°C)   |                                  |                             |                |               |
| NOTE                  | DIMENSION                    | 101.6*50.8*29mm (L*W*H)   |                                  |                             |                |               |
|                       | PACKING                      | 0.2Kg; 72pcs/15.4Kg/0.82CUFT  |                                  |                             |                |               |

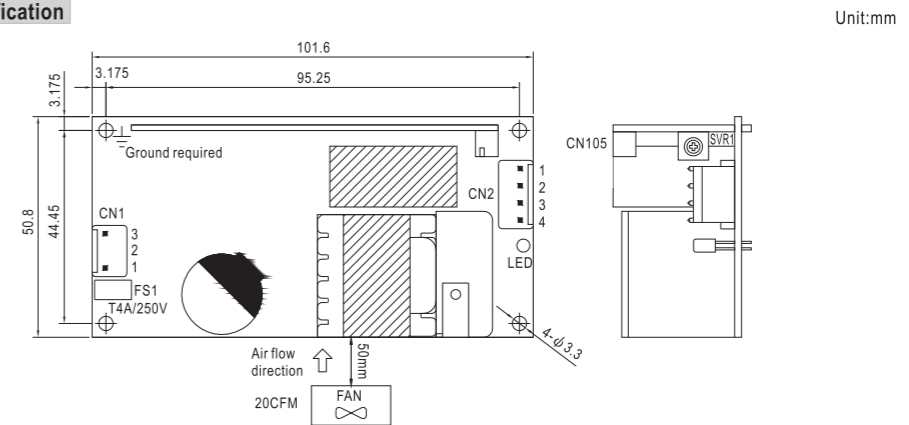
File Name:EPP-100-SPEC 2012-09-10



100W Single Output with PFC Function

**EPP-100 series**

■ Mechanical Specification



AC Input Connector (CN1) : JST B3P-VH or equivalent

| Pin No. | Assignment | Mating Housing        | Terminal                       |
|---------|------------|-----------------------|--------------------------------|
| 1       | AC/L       | JST VHR or equivalent | JST SVH-21T-P1.1 or equivalent |
| 2       | No Pin     |                       |                                |
| 3       | AC/N       |                       |                                |

DC Output Connector (CN2) : JST B4P-VH or equivalent

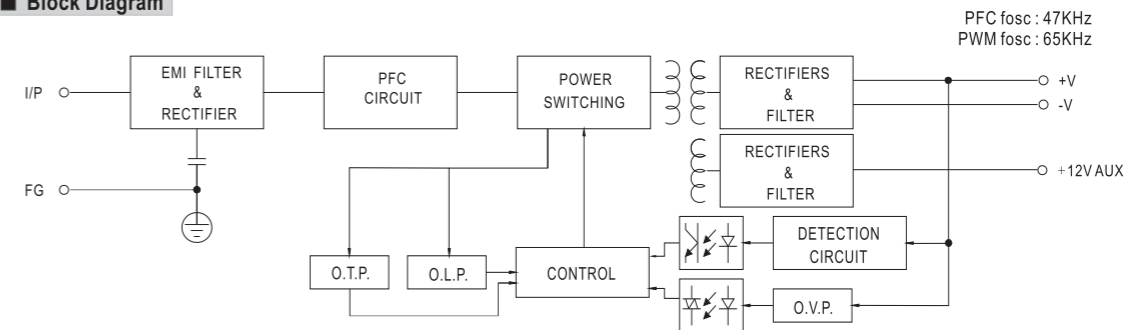
| Pin No. | Assignment | Mating Housing        | Terminal                       |
|---------|------------|-----------------------|--------------------------------|
| 1,2     | DC COM     | JST VHR or equivalent | JST SVH-21T-P1.1 or equivalent |
| 3,4     | +V         |                       |                                |

FAN Connector(CN105) : JST B2B-PH-K-S or equivalent

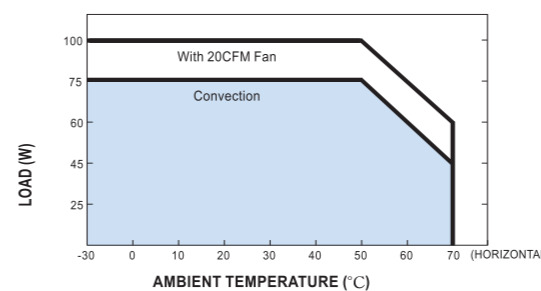
| Pin No. | Assignment | Mating Housing          | Terminal                         |
|---------|------------|-------------------------|----------------------------------|
| 1       | +12V       | JST PHR-2 or equivalent | JST SPH-002T-P0.5S or equivalent |
| 2       | DC COM     |                         |                                  |

⊕ : Grounding required

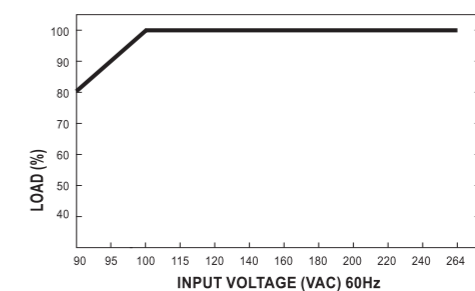
■ Block Diagram



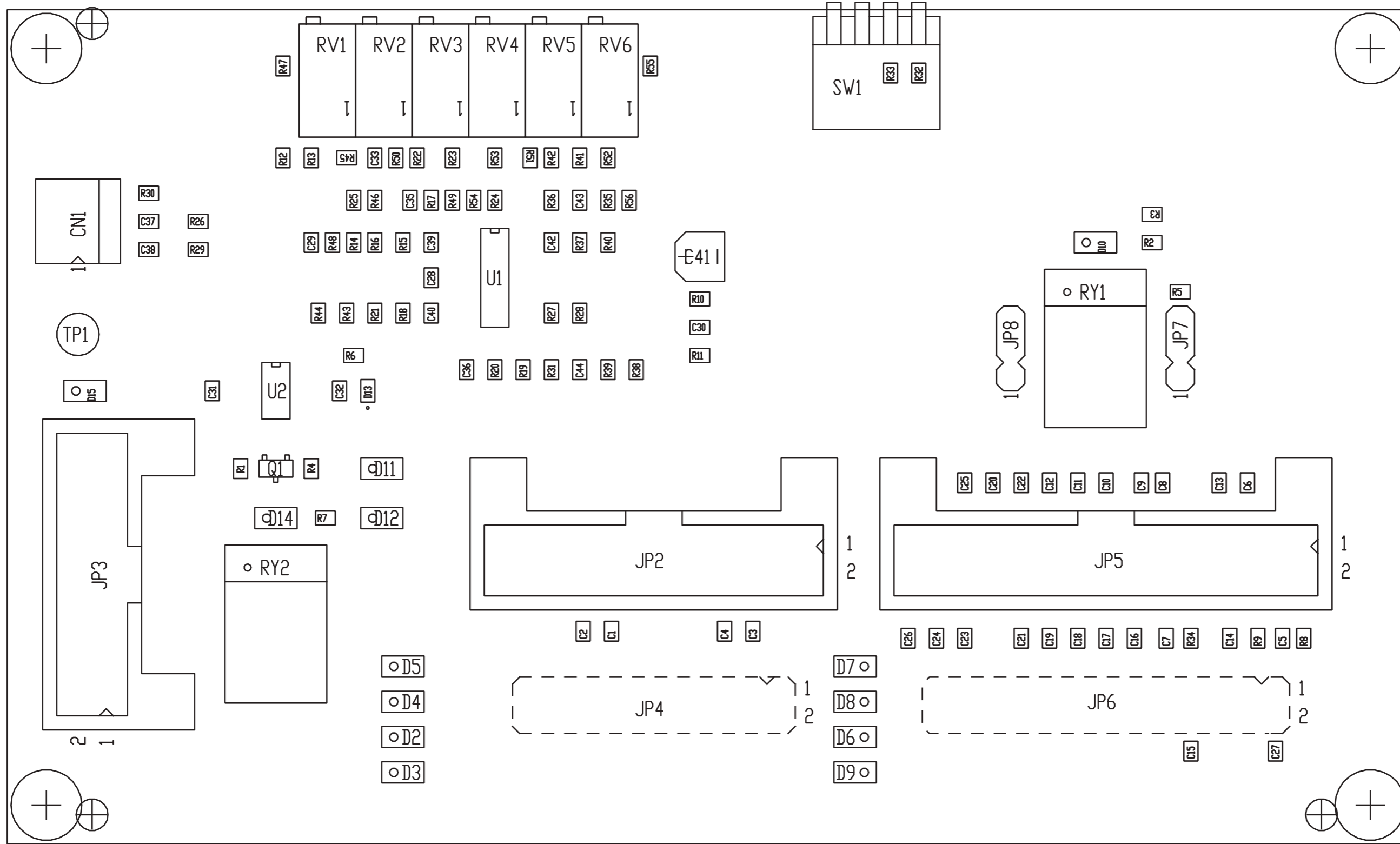
■ Output Derating



■ Output Derating VS Input Voltage

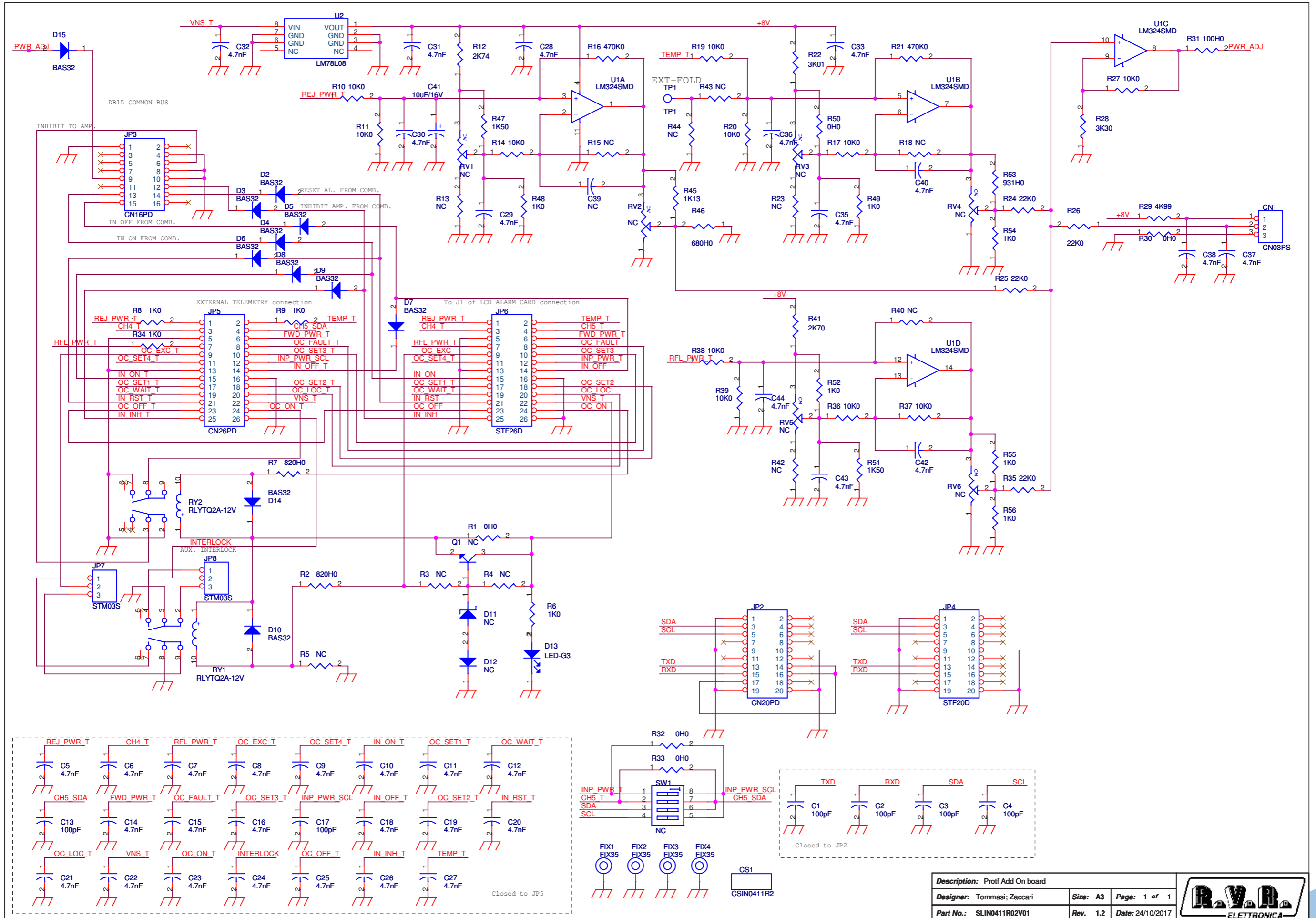


File Name:EPP-100-SPEC 2012-09-10



|   |                                     |
|---|-------------------------------------|
| PRODUCT NAME : HC2-5GRL                         | PART NAME : INTERFACE PROT-F ADD-ON |
| DESIGNER : A. Tommasi                           | DATE : 23/03/15                     |
| ARCHIVING : 'RVRUT' SERVER, 'RILASCIATI' FOLDER | REVISION : 1.0                      |
|   | SCALE : 2:1                         |
|   | SIZE : A4                           |
|   | PAGE : 1                            |
|   | DI : 1                              |
|   | DOCUMENT CODE : SLIN0411R02V01      |
|   | PROJECT CODE : 021                  |

SLIN0411R02V01



|  |                  |                         |  |
|--|------------------|-------------------------|--|
| <b>Description:</b> Protf Add On board |                  |                         |  |
| <b>Designer:</b> Tommasi, Zaccari      | <b>Size:</b> A3  | <b>Page:</b> 1 of 1     |  |
| <b>Part No.:</b> SLIN0411R02V01        | <b>Rev.:</b> 1.2 | <b>Date:</b> 24/10/2017 |  |

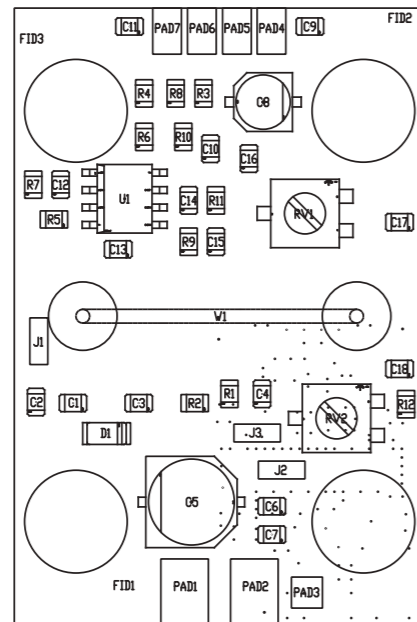
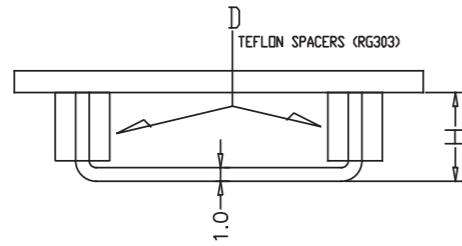
SLIN0411R02V01

Protf Add On board Revised: 24/10/2017  
 SLIN0411R02V01 Revision: 1.2  
 Tommasi; Zaccari

| Item | Quantity | Reference  | Part        | Description                       |
|------|----------|--|-------------|-----------------------------------|
| 1    | 1        | CN1  | CN03PS      | 3 poles Mascon connector          |
| 2    | 1        | CS1  | CSIN0411R2  | Printed circuit board             |
| 3    | 6        | C1, C2, C3, C4, C13, C17   | 100pF       | SMD capacitor 0805                |
| 4    | 35       | C5, C6, C7, C8, C9, C10, C11, C12, C14, C15, C16, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C35, C36, C37, C38, C40, C42, C43, C44 | 4.7nF       | SMD capacitor 0805                |
| 5    | 1        | C39  | NC          | SMD capacitor 0805                |
| 6    | 1        | C41  | 10uF/16V    | SMD electrolytic capacitor d. 4mm |
| 7    | 11       | D2, D3, D4, D5, D6, D7, D8, D9, D10, D14, D15  | BAS32       | MINIMELF SMD Diode                |
| 8    | 1        | D11  | NC          | MINIMELF SMD Zener Diode          |
| 9    | 1        | D12  | NC          | MINIMELF SMD Diode                |
| 10   | 1        | D13  | LED-G3      | LED SMD 0805                      |
| 11   | 4        | FIX1, FIX2, FIX3, FIX4   | FIX35       | fixing hole 3.5mm                 |
| 12   | 1        | JP2  | CN20PD      | 20 poles connectors Flat pc       |
| 13   | 1        | JP3  | CN16PD      | 16 poles connectors Flat pc       |
| 14   | 1        | JP4  | STF20D      | Female strip 10+10 pin            |
| 15   | 1        | JP5  | CN26PD      | 26 poles connector Flat pc        |
| 16   | 1        | JP6  | STF26D      | Female strip 13+13 pin            |
| 17   | 2        | JP7, JP8   | STM03S      | Male strip 3 pin                  |
| 18   | 1        | Q1   | NC          | Trans. NPN SOT23                  |
| 19   | 6        | RV1, RV2, RV3, RV4, RV5, RV6   | NC          | Trimmer Rg H 3296X                |
| 20   | 2        | RY1, RY2   | RLYTQ2A-12V | Relay TQ2                         |
| 21   | 5        | R1, R30, R32, R33, R50   | 0H0         | SMD resistor 0805                 |
| 22   | 2        | R2, R7   | 820H0       | SMD resistor 0805                 |
| 23   | 11       | R3, R4, R5, R13, R15, R18, R23, R40, R42, R43, R44   | NC          | SMD resistor 0805                 |
| 24   | 10       | R6, R8, R9, R34, R48, R49, R52, R54, R55, R56  | 1K0         | SMD resistor 0805                 |
| 25   | 11       | R10, R11, R14, R17, R19, R20, R27, R36, R37, R38, R39  | 10K0        | SMD resistor 0805                 |
| 26   | 1        | R12  | 2K74        | SMD resistor 0805                 |
| 27   | 2        | R16, R21   | 470K0       | SMD resistor 0805                 |
| 28   | 1        | R22  | 3K01        | SMD resistor 0805                 |
| 29   | 4        | R24, R25, R26, R35   | 22K0        | SMD resistor 0805                 |
| 30   | 1        | R28  | 3K30        | SMD resistor 0805                 |
| 31   | 1        | R29  | 4K99        | SMD resistor 0805                 |
| 32   | 1        | R31  | 100H0       | SMD resistor 0805                 |
| 33   | 1        | R41  | 2K70        | SMD resistor 0805                 |
| 34   | 1        | R45  | 1K13        | SMD resistor 0805                 |
| 35   | 1        | R46  | 680H0       | SMD resistor 0805                 |
| 36   | 2        | R47, R51   | 1K50        | SMD resistor 0805                 |
| 37   | 1        | R53  | 931H0       | SMD resistor 0805                 |
| 38   | 1        | SW1  | NC          | Dip switch 4 way                  |
| 39   | 1        | TP1  | TP1         | Test point                        |
| 40   | 1        | U1   | LM324SMD    | Quad Op. SMD SO14                 |
| 41   | 1        | U2   | LM78L08     | SMD stabilizer SO8                |

SL042MT1001

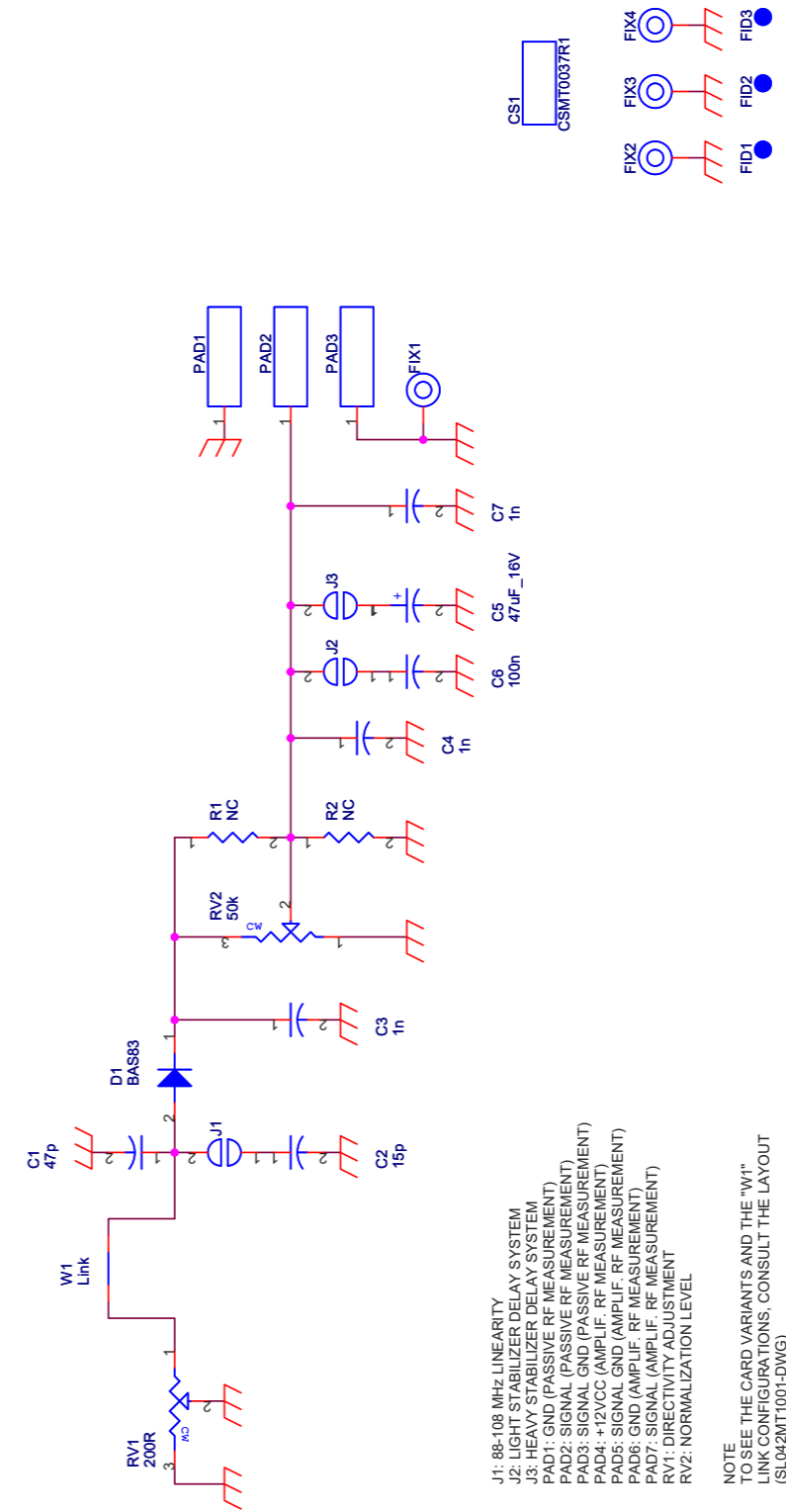
W1 LINK CONFIGURATION



- J1: 88-108 MHz LINEARITY
- J2: LIGHT STABILIZER DELAY SYSTEM
- J3: HEAVY STABILIZER DELAY SYSTEM
- PAD1: GND (PASSIVE RF MEASUREMENT)
- PAD2: SIGNAL (PASSIVE RF MEASUREMENT)
- PAD3: SIGNAL GND (PASSIVE RF MEASUREMENT)
- PAD4: +12VCC (AMPLIF. RF MEASUREMENT)
- PAD5: SIGNAL GND (AMPLIF. RF MEASUREMENT)
- PAD6: GND (AMPLIF. RF MEASUREMENT)
- PAD7: SIGNAL (AMPLIF. RF MEASUREMENT)
- RV1: DIRECTIVITY ADJUSTMENT
- RV2: NORMALIZATION LEVEL

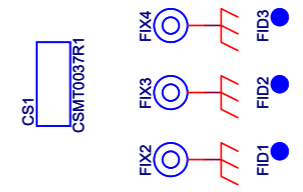
CONFIGURATIONS DETAIL

| CARD CODE   | H link W1 (mm) | W1 code AS400 | D spacers W1 | Jumper J1 | Jumper J2 | Jumper J3 |
|-------------|----------------|---------------|--------------|-----------|-----------|-----------|
| SL042MT1001 |                | none          |              |           |           |           |
| SL042MT1101 | 5.3            | B0B10020001A  |              | X         |           |           |
| SL042MT1201 | 4              | B0B10020002A  |              | X         |           |           |
| SL042MT1301 | 7.6            | B0B10020003A  |              | X         |           |           |
| SL042MT1401 | 8.5            | B0B10020004A  | X            | X         |           | X         |
| SL042MT1501 | 4.5            | B0B10020005A  |              | X         |           |           |
| SL042MT1601 | 5.5            | B0B10020006A  | X            | X         |           | X         |



J1: 88-108 MHz LINEARITY  
 J2: LIGHT STABILIZER DELAY SYSTEM  
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 PAD6: GND (AMPLIF. RF MEASUREMENT)  
 PAD7: SIGNAL (AMPLIF. RF MEASUREMENT)  
 RV1: DIRECTIVITY ADJUSTMENT  
 RV2: NORMALIZATION LEVEL

NOTE  
 TO SEE THE CARD VARIANTS AND THE "W1"  
 LINK CONFIGURATIONS, CONSULT THE LAYOUT  
 (SL042MT1001-DWG)



**R.V.R. ELETTRONICA**

Description: Generic RF PWR Measurement  
 Designer: Mauro Ucelli  
 Part No.: SL042MT1001

Page: 1 of 1  
 Size: A4  
 Rev: 1.1  
 Date: 17/04/2006

|   |                      |                             |
|---|----------------------|-----------------------------|
|   | PRODUCT NAME : HC2/2 | PART NAME : POWER METER     |
| DESIGNER : M. UCELLI                            | DATE : 27/09/11      | REVISION : 1.0              |
| ARCHIVING : 'RVRUT' SERVER, 'RILASCIATI' FOLDER | PROJECT CODE : 042   | DOCUMENT CODE : SL042MT1001 |
|   | SCALE : 2:1          | SIZE : A4                   |
|   | PAGE : 1             | DI 1                        |

SL042MT1001

RF Power measure board  
 SL042MT1001  
 Revision: 1.1  
 Generic RF PWR Measurement  
 042  
 Mauro Ucelli  
 17/04/2008

| Item | Quantity | Reference           | Part       | Description              |
|------|----------|---------------------|------------|--------------------------|
| 1    | 1        | CS1                 | CSMT0037R1 | Printed Circuit Board    |
| 2    | 1        | C1                  | 47p        | SMD 0805 COG Capacitor   |
| 3    | 1        | C2                  | 15p        | SMD 0805 COG Capacitor   |
| 4    | 3        | C3,C4,C7            | 1n         | SMD 0805 Capacitor       |
| 5    | 1        | C5                  | 47uF 16V   | Elect. SMD d. 6.3mm Cap. |
| 6    | 1        | C6                  | 100n       | SMD 0805 Capacitor       |
| 7    | 1        | D1                  | BAS83      | MINIMELF SMD Diode       |
| 8    | 3        | FID1,FID2,FID3      | FID        |                          |
| 9    | 4        | FIX1,FIX2,FIX3,FIX4 | FIX35      | Fixing Hole 3.5mm        |
| 10   | 3        | J1,J2,J3            | JSMD       | SMD Pad to solder        |
| 11   | 3        | PAD1,PAD2,PAD3      | PAD        |                          |
| 12   | 1        | RV1                 | 200R       | Trimmer SMD              |
| 13   | 1        | RV2                 | 50k        | Trimmer SMD              |
| 14   | 2        | R1,R2               | NC         | SMD 0805 Res.            |
| 15   | 1        | W1                  | Link       | Wire to solder           |