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17/07/15		1/19

Pierre Auger Observatory

Surface Detector Electronics Upgrade Loose Parts Specification

Abstract: This document is defining and describing the loose parts, which are the parts connected or mounted on the UUB PCB but not soldered.

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<i>Local Reference:</i>	ATRIUM 9272	<i>Project Reference:</i>	WP5-LPSC-17D



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ACRONYMS

ADC	Analog to Digital Converter
AWG	American Wire gauge
BGA	Ball Grid Array
CR	Configurational Requirement
DC	Direct Current
EICD	Electrical Interface Control Document
ER	Environmental Requirement
FPGA	Full Programmable Gate Array
FR	Functional Requirements
GPS	Global Positioning System
ICD	Interfaces Control Document
IR	Interface Requirements
n/a	non applicable
OR	Operational Requirements
PBS	Product Breakdown Structure
PCB	printed Circuit Board
PMT	Photo Multiplier Tube
PR	Physical Requirements
QR	Quality Requirements
SDE	Surface Detector Electronics
SDEU	Surface Detector Electronics Upgrade
SR	Support Requirements
TBC	To Be Confirmed
TBD	To Be Defined
TBW	To Be Written
UB	Unified Board
UUB	Upgraded Unified Board
UHE	Ultra High Energy
UHECR	Ultra High Energy Cosmic Ray
VM	Verification Matrix



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DOCUMENT CHANGE RECORD

Issue	Revision	Issue Date	Changes Approved by	Modified Pages Numbers, Change Explanations and Status
17	A	20/05/15	E. Lagorio	DRAFT for approbation
17	B	21/05/15	P. Stassi	Minor corrections
17	C	09/07/15	P. Stassi	Full completion
17	D	17/07/15	P. Stassi	Front panel drawing update



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1. INTRODUCTION

This document is defining and describing the loose parts, which are the parts connected or mounted on the UUB PCB but not soldered.

1.1. *Reference Documents*

- RD1 WP10LPSC03x_SDEU_Specification
- RD2 WP10LPSC05x_SDEU_EICD



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2. DEFINITION AND DESCRIPTION

1.2. Definition

The loose parts are the parts mounted or connected on UUB PCB of the SDEU, excluding the PCB and the components soldered on it and the enclosure box.

The loose parts are listed in the table below:

Ref	Name	Comments	Qty
LG1	GPS receiver ¹	GPS receiver board I-Lotus M12M timing	1
LG2	GPS screw	For GPS receiver board mounting	8
LG3	GPS spacer	Nylon spacers for GPS receiver board mounting	4
LF1	Fuse holder & cable	Mounted on the front panel	1
LF2	Fuse	Placed in the fuse holder, value = 750 mA	1
LC1	GPS cable	SMA (front panel) to MMCX antenna coaxial cable	1
LC2	Digital cable	DB26HD (front panel) to HE26 (UUB) flat twisted cable	2
LC3	PMT cable	DB15HD (front panel) to HE14 (UUB) flat twisted cable	2
LC4	Radio cable	DB9 to DB9 molded cable (external)	1
LC5	Power supply connector	Binder plug connector (external)	1
LS1	Board stiffener	Aluminum bar to stiff the UUB	1
LS2	Board stiffener screw	For stiffener fixation on the UUB	4
LF1	Front panel	UUB front panel	1
LF2	Front panel screw ²	To fix the front panel on the enclosure	14

1 – GPS receivers are provided by CWRU Group.

2 – Front panel screws already procured and stored in Malargue

Table 2a – Loose parts list

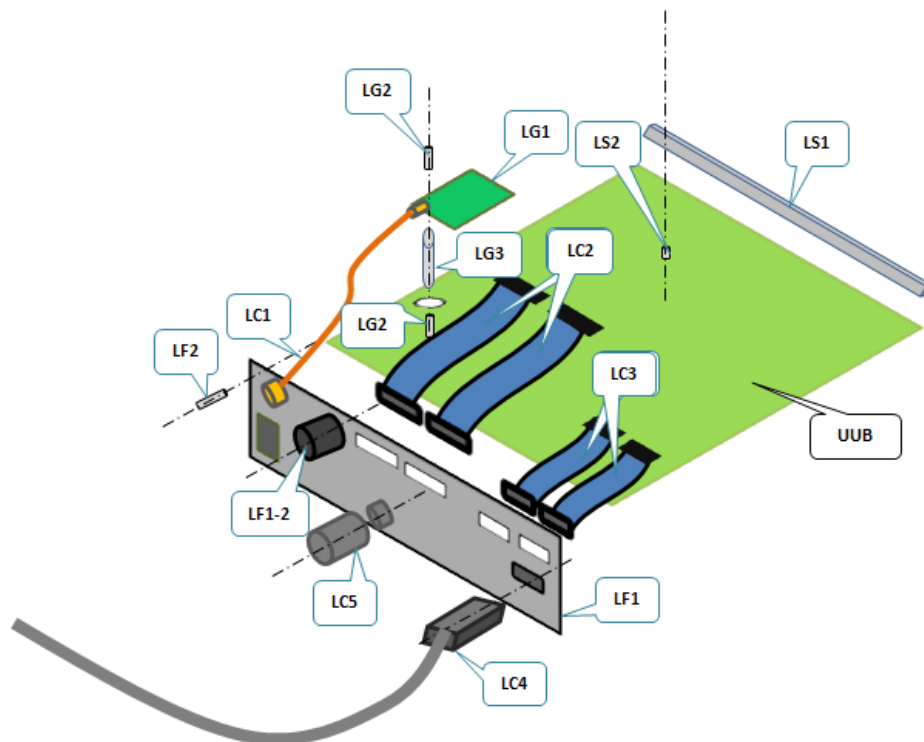


Figure 2a – Loose parts



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3. SPECIFICATIONS

1.3. #LG1 – GPS Receiver

OEM Timing GPS

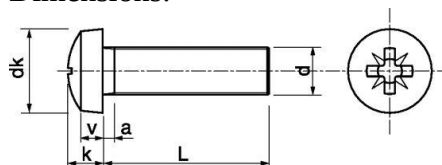
Reference: I-LOTUS M12M timing

The GPS receivers are provided by CWRU Group

1.4. #LG2 – GPS screw

A4 Stainless Steel screws used to fix GPS board to UUB Mother-board.

Dimensions:



d : M3

L: 4 mm

Type: Round-pan head.



POZIDRIV

Or

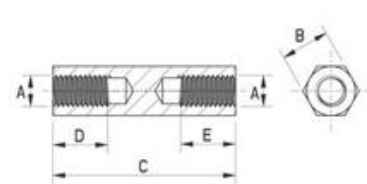


PHILLIPS

1.5. #LG3 – GPS spacer

Four A4 Stainless Steel spacers for GPS. Two #LG2 screws for each spacer, one at the GPS side and one at the UUB mother-board (SDE-002-002-IExx) side.

Dimensions:



A: M3

B: 5 mm

C: 8 mm

1.6. #LF1 – Fuse holder & cable

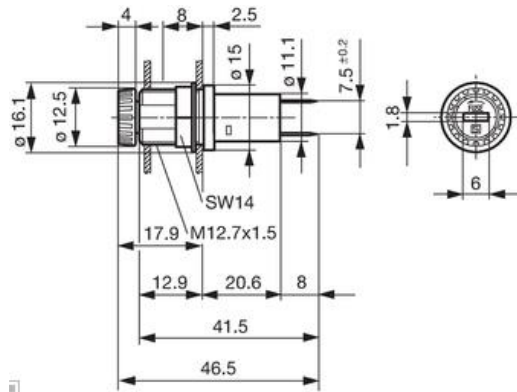
SDEU Current protection fuse holder. Rear side panel mount, with finger-grip, for 5 x 20mm fuses.



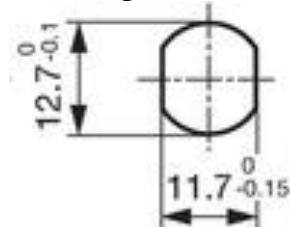


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Dimensions:



Mounting hole:



Part Reference example:

- SCHURTER 3101.0125

Cable: two multi-wires AWG=22 cables soldered to the fuse-holder with heat shrink protection.
Length = 4 cm

1.7. #LF2 – Fuse

5 x 20 mm fuse, glass or ceramic, 750 mA fast acting



Part Reference example:

- BUSSMAN GMA-750-R



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1.8. #LC1 – GPS cable

RG316 Coax cable with SMA straight BH jack and MMCX right angle plug. Length=130mm



RF Cable
RF316-01BJ1-03RP1-0130

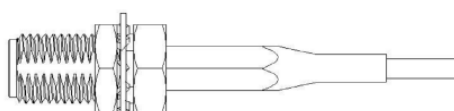
Cable Type	End 1	End 2	Labels	Length
RG316 coax cable	SMA Straight BH Jack	MMCX R/A Plug	No Label	130 mm



Part Reference example:

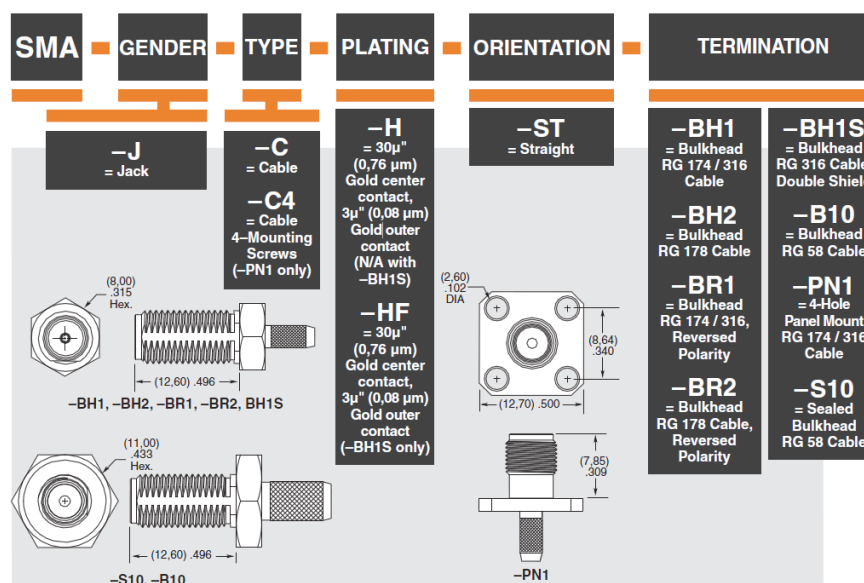
- SAMTEC RF316-01BJ1-03RP1-0130

SMA end:



connector Reference example:

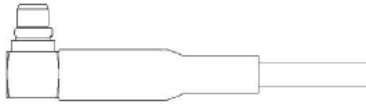
- SAMTEC SMA-J-C-H-ST-BH1





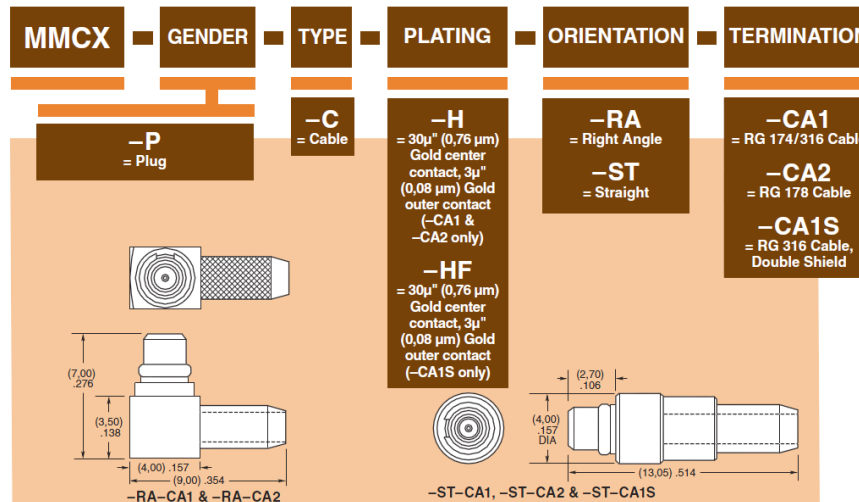
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MMCX end:

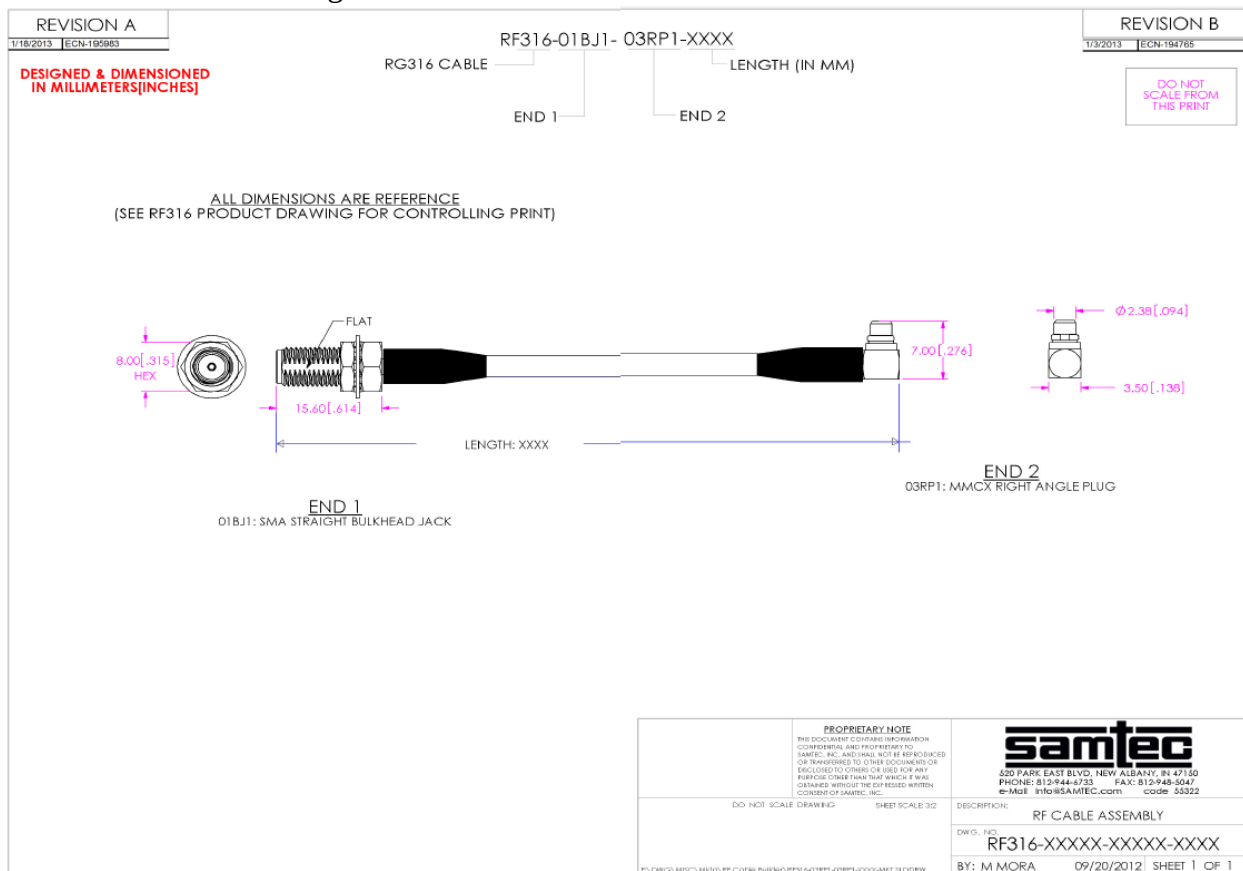


connector Reference example:

- SAMTEC MMCX-P-C-H-RA-CA1



Cable mechanical drawing:





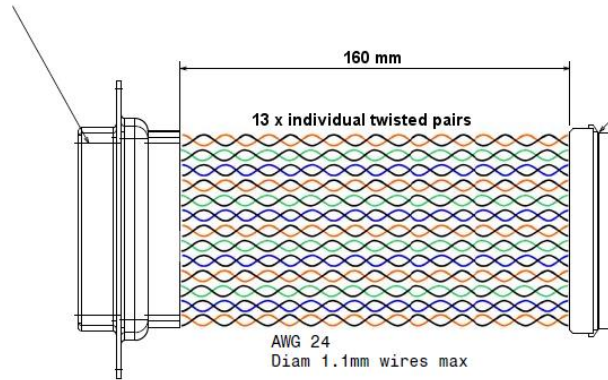
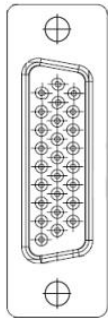
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1.9. #LC2 – Digital cable

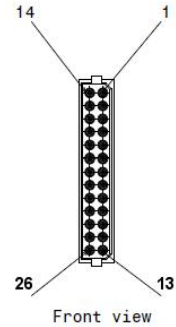
26 contacts multi-wire AWG 24 twisted pair cable (individual pairs) with SUB-D HD 26 points crimp poles connector and 2mm, 2x13 poles HARWIN M80-8882605 rectangular connector.
Length=160 mm.

Connector 1:
D SUB HD Female 26 Crimp
poles connector

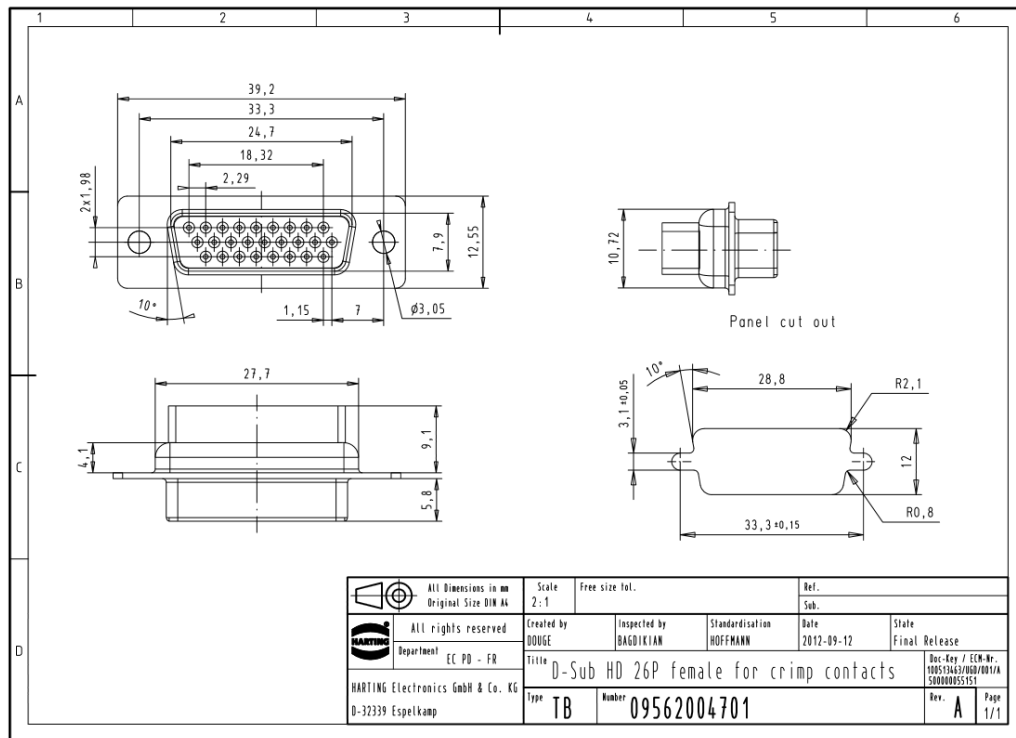
Front view



Connector 2:
2mm Female 2x13 poles
HARWIN M80 - 8882605

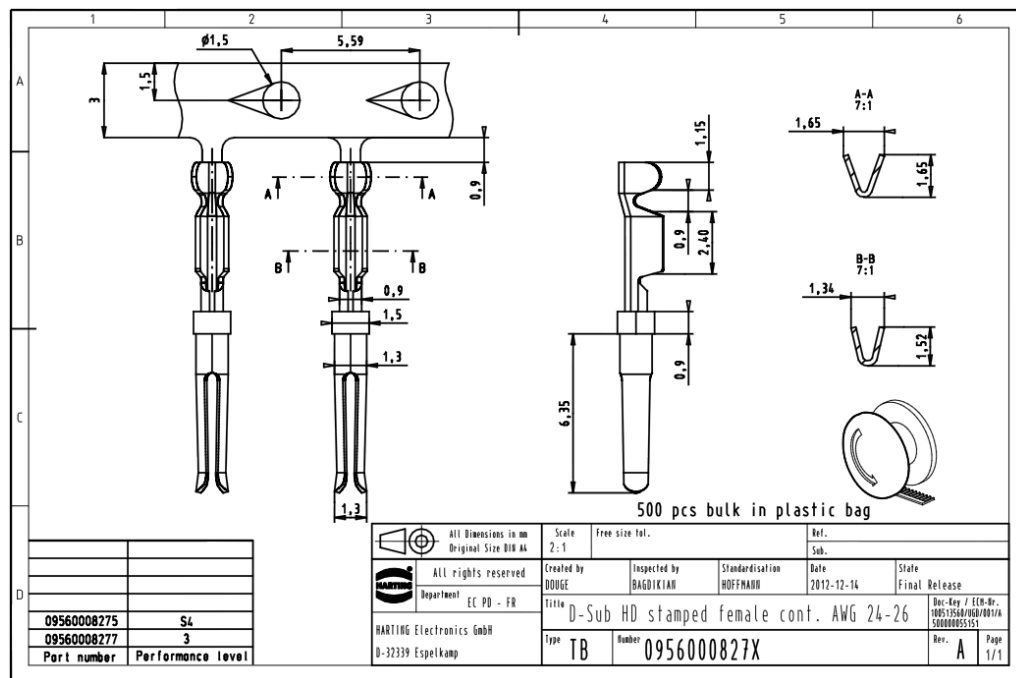


SUB-D end:





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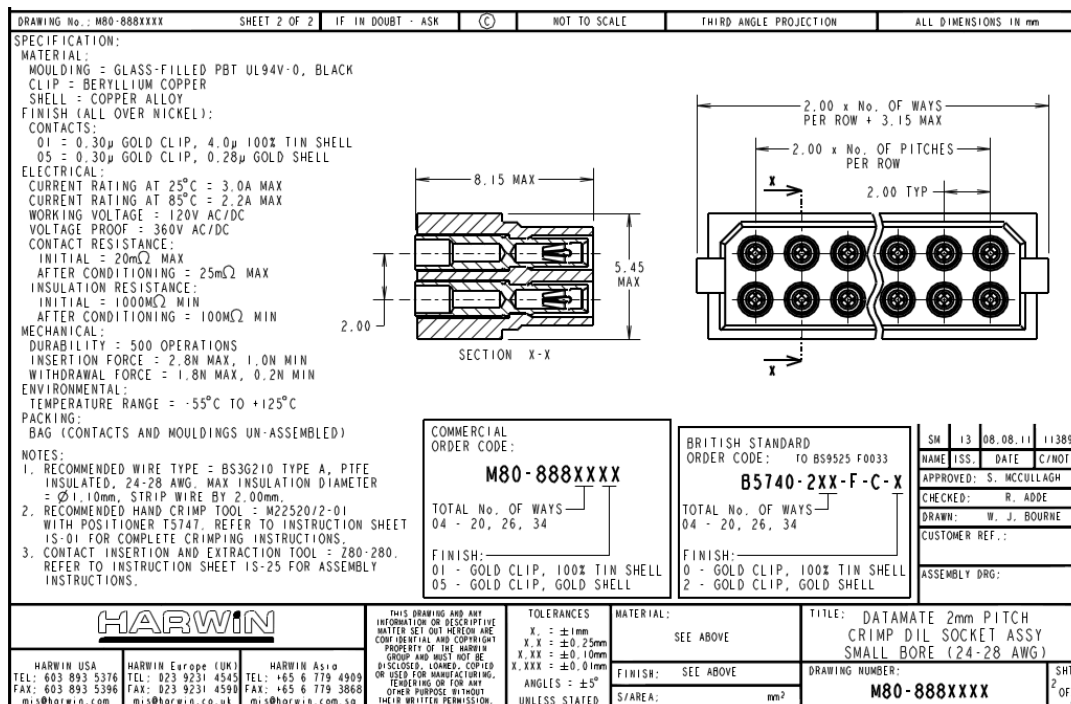
Connector Reference example:

- HARTING 0956 200 4701 – female crimp contacts: 0956000827X

Rectangular end:

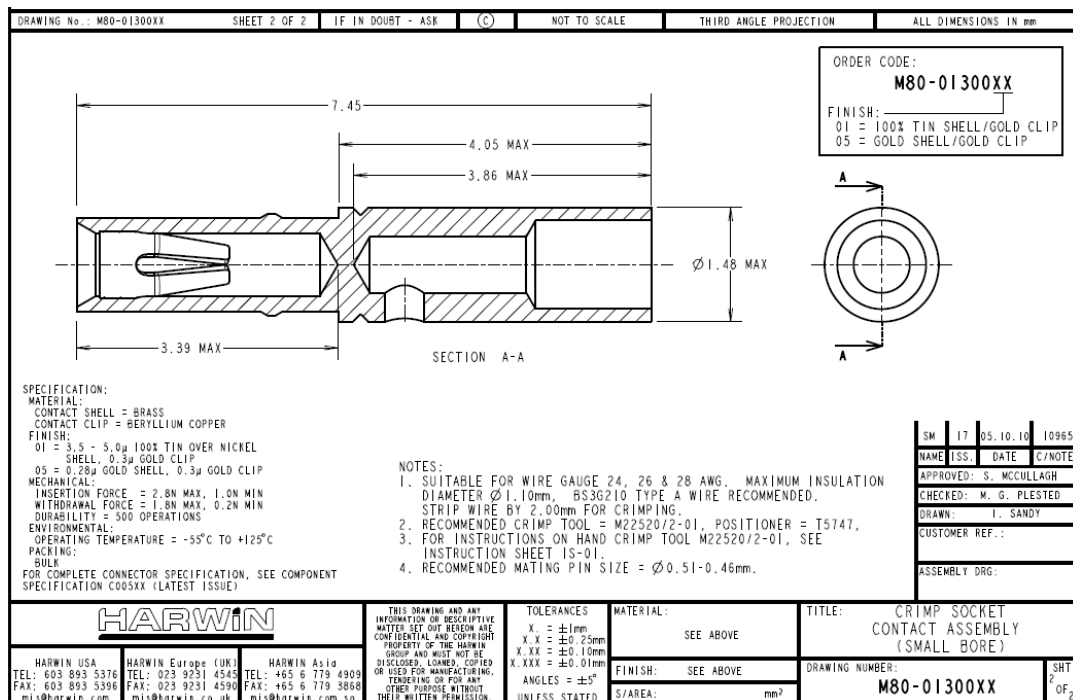
Connector Reference example:

- HARWIN M80-8882605 – barrel crimp contacts: M80-013-0005



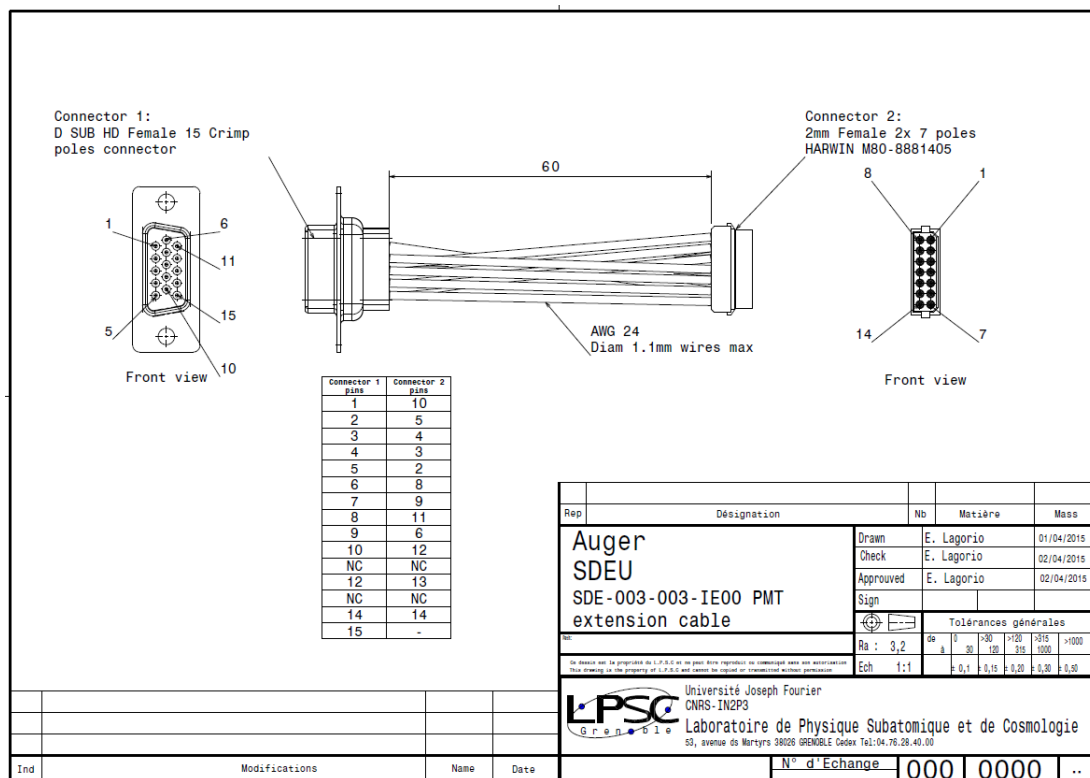


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1.10. #LC3 – PMT cable

14 contacts multi-wire AWG 24 cable (individual wires) with SUB-D HD 15 points crimp poles connector and 2mm, 2x7 poles HARWIN M80-8881405 rectangular connector. Length=60mm.





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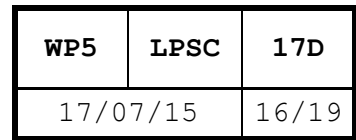
Rectangular end:

Connector Reference example:

- HARWIN M80-8881405 – barrel crimp contacts: M80-013-0005

DRAWING No.: M80-888XXX		SHEET 2 OF 2		IF IN DOUBT - ASK	NOT TO SCALE	THIRD ANGLE PROJECTION	ALL DIMENSIONS IN mm
SPECIFICATION: MATERIAL: MOULDING = GLASS-FILLED PBT UL94V-0, BLACK CLIP = BERYLLIUM COPPER SHELL = COPPER ALLOY FINISH (ALL OVER NICKEL): CONTACTS: 01 = 0.30µ GOLD CLIP, 4.0µ 100% TIN SHELL 05 = 0.30µ GOLD CLIP, 0.28µ GOLD SHELL ELECTRICAL: CURRENT RATING AT 25°C = 3.0A MAX CURRENT RATING AT 85°C = 2.2A MAX WORKING VOLTAGE = 120V AC/DC VOLTAGE PROOF = 360V AC/DC CONTACT RESISTANCE: INITIAL = 20mΩ MAX AFTER CONDITIONING = 25mΩ MAX INSULATION RESISTANCE: INITIAL = 1000MΩ MIN AFTER CONDITIONING = 100MΩ MIN MECHANICAL: DURABILITY = 500 OPERATIONS INSERTION FORCE = 2.8N MAX, 1.0N MIN WITHDRAWAL FORCE = 1.8N MAX, 0.2N MIN ENVIRONMENTAL: TEMPERATURE RANGE = -55°C TO +125°C PACKING: BAG (CONTACTS AND MOULDINGS UN-ASSEMBLED)							
NOTES: 1. RECOMMENDED WIRE TYPE = BS3G210 TYPE A, PTFE INSULATED, 24-28 AWG. MAX INSULATION DIAMETER = Ø1.10mm. STRIP WIRE BY 2.00mm. 2. RECOMMENDED HAND CRIMP TOOL = M22520/2-01 WITH POSITIONER T5747. REFER TO INSTRUCTION SHEET IS-01 FOR COMPLETE CRIMPING INSTRUCTIONS. 3. CONTACT INSERTION AND EXTRACTION TOOL = 280-280. REFER TO INSTRUCTION SHEET IS-25 FOR ASSEMBLY INSTRUCTIONS.				COMMERCIAL ORDER CODE: M80-888XXX TOTAL No. OF WAYS 04 - 20, 26, 34 FINISH: 01 - GOLD CLIP, 100% TIN SHELL 05 - GOLD CLIP, GOLD SHELL		BRITISH STANDARD ORDER CODE: TO BS9525 F0033 B5740-2XX-F-C-X TOTAL No. OF WAYS 04 - 20, 26, 34 FINISH: 0 - GOLD CLIP, 100% TIN SHELL 2 - GOLD CLIP, GOLD SHELL	
HARWIN HARWIN USA TEL: 603 893 5376 FAX: 603 893 5396 mis@harwin.com HARWIN Europe (UK) TEL: 023 9231 4545 FAX: 023 9231 4590 mis@harwin.co.uk HARWIN Asia TEL: +65 6 779 4909 FAX: +65 6 779 3868 mis@harwin.com.sg				THIS DRAWING AND ANY INFORMATION OR DESCRIPTIVE MATTER SET OUT HEREON ARE CONFIDENTIAL AND COPYRIGHT PROPERTY OF THE HARWIN GROUP AND MUST NOT BE DISCLOSED, LOANED, COPIED OR USED FOR MANUFACTURING, TENDERING OR FOR ANY OTHER PURPOSE WITHOUT THEIR WRITTEN PERMISSION.		TOLERANCES X. = ±1mm X.X = ±0.25mm X.XX = ±0.10mm X.XXX = ±0.01mm ANGLES = ±5° UNLESS STATED	
MATERIAL: SEE ABOVE				FINISH: SEE ABOVE		TITLE: DATAMATE 2mm PITCH CRIMP DIL SOCKET ASSY SMALL BORE (24-28 AWG)	
DRAWING NUMBER: M80-888XXX				SH2 2 OF 2		ASSEMBLY DRG:	

DRAWING No.: M80-01300XX		SHEET 2 OF 2		IF IN DOUBT - ASK	NOT TO SCALE	THIRD ANGLE PROJECTION	ALL DIMENSIONS IN mm
ORDER CODE: M80-01300XX FINISH: 01 = 100% TIN SHELL/GOLD CLIP 05 = GOLD SHELL/GOLD CLIP							
NOTES: 1. SUITABLE FOR WIRE GAUGE 24, 26 & 28 AWG. MAXIMUM INSULATION DIAMETER Ø1.10mm. BS3G210 TYPE A WIRE RECOMMENDED. STRIP WIRE BY 2.00mm FOR CRIMPING. 2. RECOMMENDED CRIMP TOOL = M22520/2-01, POSITIONER = T5747. 3. FOR INSTRUCTIONS ON HAND CRIMP TOOL M22520/2-01, SEE INSTRUCTION SHEET IS-01. 4. RECOMMENDED MATING PIN SIZE = Ø0.51-0.46mm.							
SPECIFICATION: MATERIAL: CONTACT SHELL = BRASS CONTACT CLIP = BERYLLIUM COPPER FINISH: 01 = 3.5 - 5.0µ 100% TIN OVER NICKEL SHELL, 0.3µ GOLD CLIP 05 = 0.28µ GOLD SHELL, 0.3µ GOLD CLIP MECHANICAL: INSERTION FORCE = 2.8N MAX, 1.0N MIN WITHDRAWAL FORCE = 1.8N MAX, 0.2N MIN DURABILITY = 500 OPERATIONS ENVIRONMENTAL: OPERATING TEMPERATURE = -55°C TO +125°C PACKING: BULK FOR COMPLETE CONNECTOR SPECIFICATION, SEE COMPONENT SPECIFICATION C005XX (LATEST ISSUE)							
HARWIN HARWIN USA TEL: 603 893 5376 FAX: 603 893 5396 mis@harwin.com HARWIN Europe (UK) TEL: 023 9231 4545 FAX: 023 9231 4590 mis@harwin.co.uk HARWIN Asia TEL: +65 6 779 4909 FAX: +65 6 779 3868 mis@harwin.com.sg				THIS DRAWING AND ANY INFORMATION OR DESCRIPTIVE MATTER SET OUT HEREON ARE CONFIDENTIAL AND COPYRIGHT PROPERTY OF THE HARWIN GROUP AND MUST NOT BE DISCLOSED, LOANED, COPIED OR USED FOR MANUFACTURING, TENDERING OR FOR ANY OTHER PURPOSE WITHOUT THEIR WRITTEN PERMISSION.		TOLERANCES X. = ±1mm X.X = ±0.25mm X.XX = ±0.10mm X.XXX = ±0.01mm ANGLES = ±5° UNLESS STATED	
MATERIAL: SEE ABOVE				FINISH: SEE ABOVE		TITLE: CRIMP SOCKET CONTACT ASSEMBLY (SMALL BORE)	
DRAWING NUMBER: M80-01300XX				SH2 2 OF 2		ASSEMBLY DRG:	

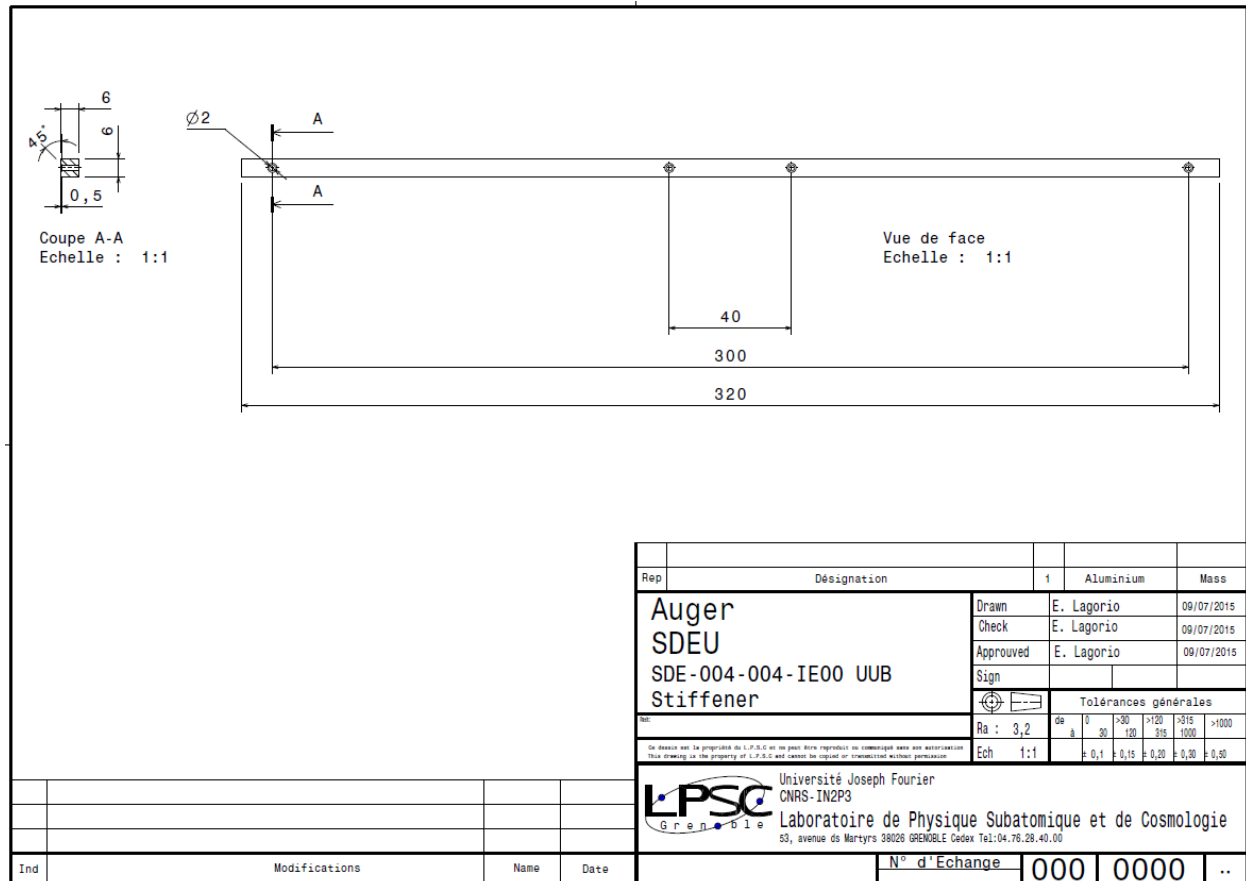




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1.13. #LS1 – Board stiffener

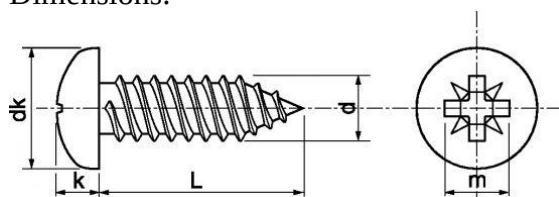
Aluminum bar, square section.



1.14. #LS2 – Board stiffener screw

A4 Stainless Steel screws used to attach the stiffener to the UUB Mother-board.

Dimensions:



d: 2.9 mm

L: 6.5 mm

Type:

Round-pan head.



POZIDRIV

Or



PHILLIPS

