



SPIRE FPU Subsystem Harnesses Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 1 of 7

SPIRE FPU Subsystem Harnesses Procurement Specification

PREPARED BY:	Douglas Griffin (SPIRE Systems Engineer)	Date:
APPROVED BY:	Eric Clark (SPIRE PA Manager)	Date:
APPROVED BY:	Ian Pain (ATC - SPIRE BSM)	Date:
APPROVED BY:	Chris Brockley-Blatt (MSSL - SPIRE Structure Sub-system)	Date:
APPROVED BY:	Jean-Louis Augeres (CEA – SPIRE Cooler)	Date:
APPROVED BY:	Peter Hargrave (U. of Cardiff – S-Cal and P-Cal)	Date:
APPROVED BY:	Dave Smith (RAL – AIV Manager)	Date:



SPIRE FPU Subsystem Harnesses Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 2 of 7

CHANGE RECORD

ISSUE	DATE	SECTION	CHANGE(S) MADE
Issue 0.1	1 Aug 2002		Comments
Issue 0.2	7 Aug. 2002		Updated
Issue 1.0	4 Sept. 2002		First Issue

CONTENTS

Change Record	2
Nomenclature	3
Applicable Documents	3
Reference Documents	3
1. Scope	4
2. Description	4
3. General Specifications	4
3.1 Build Standard	4
3.2 Harness routing.....	4
3.3 Connectors.....	4
3.3.1 MDM Connectors	5
3.3.2 Cernox Thermistors	5
3.4 Wire Specifications.....	5
3.4.1 Isothermal Copper wiring (STQ/UTQ/STT).....	5
3.4.2 Isothermal Copper Cables (STP)	5
3.4.3 Stainless Steel STQ.....	5
3.5 Bundle Overshield	5
3.6 Acceptance Testing.....	6
3.7 Labelling.....	6
3.8 Bake-out	6
3.9 Transportation.....	6
4. Cooler Harnesses (F16/F17)	6
5. S-Cal Harnesses (F18/F19)	6
6. Thermometry Harnesses (F20/F21)	6
7. BSM Harnesses (F22/F23)	6
8. Internal STM Harness	7
9. External STM Harness	7



SPIRE FPU Subsystem Harnesses Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 3 of 7

NOMENCLATURE

ADP	Acceptance Data Package
BDA	Bolometer Detector Array
BSM	Beam Steering Mechanism
CQM	Cryogenic Qualification Model
FPU	Focal Plane Unit
FS	Flight Spare
JFP	Photometer JFET assembly
JFS	Spectrometer JFET Assembly
MRB	Materials Review Board
MSSL	Mullard Space Science Laboratory
PFM	Proto-Flight Model
PLW	Long—wave Photometer
PMW	Medium-Wave Photometer
PSW	Short-wave Photometer
PTC	Photometer Thermal Control
RAL	Rutherford Appleton Laboratory
S-CAL	Spectrometer Stimulus Source
SLF	Long-Wave Spectrometer Feedthrough
SLW	Long-Wave Spectrometer
SSF	Short-Wave Spectrometer Feedthrough
SSW	Short-wave Spectrometer
STM	Structural Thermal Model
STM	Structural Thermal Model

APPLICABLE DOCUMENTS

AD 1	SPIRE Harness Definition SPIRE-RAL-PRJ-000608, Issue 1.0, 8 July 2002.
AD 2	MSSL - A1/5264/315 - SPIRE FPU Subsystem Harness Routing. Issue 1.0, 1/8/02. (Including the following sheets) <ul style="list-style-type: none">▪ A1/5264/315 Cable Harness General Assembly▪ A1/5264/315-1 BSM Harness Primary▪ A1/5264/315-2 BSM Harness Redundant▪ A1/5264/315-3 Cooler Harness Primary▪ A1/5264/315-4 Cooler Harness Redundant▪ A1/5264/315-5 SCAL Harness Primary▪ A1/5264/315-6 SCAL Harness Redundant▪ A1/5264/315-7 Thermometry Harness Primary▪ A1/5264/315-8 Thermometry Harness (STM)▪ A1/5264/315-10 Thermometry Harness Redundant
AD 3	SPIRE Product Assurance Plan, SPIRE-RAL-PRJ-000017, Issue 1.0, 11 April 2001.

REFERENCE DOCUMENTS

- RD 1 SPIRE Instrument Block Diagram, Issue 4.6, 9 July 2002.
RD 2 ECSS-Q-70-08A, The manual soldering of high-reliability electrical connections, 6 August 1999.



SPIRE FPU Subsystem Harnesses

Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 4 of 7

1. SCOPE

This document outlines the specifications for the procurement of the following harnesses for the Herschel/SPIRE instrument.

Subsystem

1. STM/CQM/FS Filter to Cooler Harnesses (F16/F17)
2. STM/CQM/FS Filter to Spectrometer Calibrator Harnesses (F18/F19)
3. STM/CQM/FS Thermometry Harnesses (F20/F21)
4. STM/CQM/FS Filter to Beam Steering Mechanism Harnesses (F22/F23)

STM Thermometry

1. Internal STM Thermometry Harness
2. External STM Thermometry Harness

2. DESCRIPTION

The harnesses F16 through F23 connect the subsystems within the FPU with the RF Filter Units mounted in the FPU cover. The Internal/External STM Thermometry Harnesses connect the thermistors to the SPIRE Cryoharness.

3. GENERAL SPECIFICATIONS

3.1 BUILD STANDARD

All harnesses are to be constructed to Flight Standard (as described in AD 3) supplied with an Acceptance Data Package (ADP) that contains at least the following information:

1. Documentation indicating part traceability.
2. Results of tests and inspections carried out during manufacture.
3. Certificate of conformance to this procurement specification.

The harnesses are to be capable of being thermally cycled from room temperature to the SPIRE operating temperature.

3.2 HARNESS ROUTING

The routing of the subsystem harness and the Internal STM harness inside the FPU is defined in AD 2. A wiring horse that represents the SPIRE Optical Bench, Cooler, SCAL Unit and BSM unit will be provided for the purpose of routing these harnesses.

The external STM harness does not require a wiring horse.

3.3 CONNECTORS

Wire terminations in all connectors will be made according to RD 2 unless normal good practice for the fabrication of cryogenic harnesses dictates otherwise. Any non-compliance to RD 2 is to be documented in the ADP and to be reviewed by a MRB appointed by the SPIRE Project Office.

A KIP (Key Inspection Point) occurs after solder termination and prior to connector potting. The inspection is to be conducted by an officer nominated by the RAL PA department.



SPIRE FPU Subsystem Harnesses Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 5 of 7

3.3.1 MDM Connectors

All MDM connectors are to be compliant to MIL-PRF-83513. The finish of the connector shells shall be electroless nickel.

The rear of the connectors are to be potted with Stycast 2850 FT, using Stycast Catalyst 9. The potting is to electrically bond the harness shield to the metal chassis of the connector and provide 360° termination of the shield around the signal conductors.

The MDM connectors shall be equipped with screw posts of a type agreed between the contractor and RAL.

3.3.2 Cernox Thermistors

The four wire Cernox thermistors will be free issued to the contractor. The contractor will carry out the termination of the harness to the thermistors.

3.4 WIRE SPECIFICATIONS

3.4.1 Isothermal Copper wiring (STQ/UTQ/STT)

STQ: 30AWG Stranded copper conductors (seven strands of $\varnothing 0.102\text{mm}$) insulated with FEP to $\varnothing 0.50\text{mm}$ and twisted into a quad. The quad is shielded with $\varnothing 0.05\text{mm}$ stainless steel strands (112 ends min. 90%) and jacketed with FEP to $\varnothing 1.85\text{mm}$ nominal.

UTQ: Where an Unshielded Twisted Quad is specified, STQ will be used; the shields are to be terminated to the connector chassis.

STT: Where a Shielded Twisted Triple is specified, STQ will be used and the spare conductor terminated to the shield pins on the connectors.

3.4.2 Isothermal Copper Cables (STP)

STP: 30AWG Stranded copper conductors (seven strands of $\varnothing 0.1\text{mm}$) insulated with FEP to $\varnothing 0.50\text{mm}$ and twisted into a pair. The pair is shielded with $\varnothing 0.05\text{mm}$ stainless steel strands (80 ends min.90%) and jacketed with FEP to $\varnothing 1.65\text{mm}$ nominal.

3.4.3 Stainless Steel STQ

STQ: Four twisted 38AWG solid 316 Stainless Steel wires. $\varnothing 0.102\text{mm}$ FEP insulation to $\varnothing 0.30\text{mm}$. 316 stainless steel braided shield (80 ends, $\varnothing 0.05\text{mm}$ min.90%). Overall FEP jacket to $\varnothing 1.45\text{mm}$ nominal.

3.5 BUNDLE OVERSHIELD

An 80% coverage harness overshield is to be used. This overshield is to be bonded 360° to the body of the connectors. Strands of 44 AWG 316 SS wire are to be used to make up the shield.



SPIRE FPU Subsystem Harnesses Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 6 of 7

3.6 ACCEPTANCE TESTING

Each harness assembly is to be thermally cycled between room temperature and 77K twice. The hold time at 77K is to be at least 30 minutes. The continuity of each individual signal function is to be measured at 77K and 295K and documented. The threshold resistances for continuity and open circuit shall be agreed between the contractor and RAL. Any values falling outside these limits shall be fully recorded.

This testing is to be carried out by the contractor.

3.7 LABELLING

The tail is to be clearly marked with HSFPU FxxPxx; where "xx" is the two digit numerical identifier of the harness. of the connector to which the tail connects. The feedthroughs are to be marked with the identifier HSxxx; where xxx identifies the three-letter acronym for the particular feedthrough. The model of the feedthroughs (PFM or QM/FS) is also to be marked.

3.8 BAKE-OUT

The harnesses assemblies are to be baked out prior to delivery at 105°C for 72 hours at less than 10^{-5} torr. The out-gassing products between 2-100amu are to be measured and recorded $< 10^{-9}$ Torr.

3.9 TRANSPORTATION

The harnesses are to be delivered bagged in a sealed dry nitrogen atmosphere. A transportation jig will be used to support the harness and prevent handling damage.

4. COOLER HARNESSSES (F16/F17)

Pin allocation, Harness lengths and layup as per AD 1, §4.5.16 and §4.5.17
Routing as per AD 2.
These harnesses pass through a stray light baffle plate supplied by MSSL.

5. S-CAL HARNESSSES (F18/F19)

Pin allocation, Harness lengths and layup as per AD 1, §4.5.18 and §4.5.19

6. THERMOMETRY HARNESSSES (F20/F21)

Pin allocation, Harness lengths and layup as per AD 1, §4.5.20 and §4.5.21

7. BSM HARNESSSES (F22/F23)

Pin allocation, Harness lengths and layup as per AD 1, §4.5.22 and §4.5.23

These harnesses pass through a stray light baffle plate supplied by MSSL.



SPIRE FPU Subsystem Harnesses Procurement Specification

Doc #: SPIRE-RAL-DOC-001362
Issue: 1.0
Date: 4 September 2002
Page 7 of 7

8. INTERNAL STM HARNESS

Pin allocation, Harness lengths and layup as per AD 1, §4.8.1

9. EXTERNAL STM HARNESS

Pin allocation, layup as per AD 1, §4.8.1

Harness lengths as follows:

Thermistor	Copper length	Stainless Steel Length
JFP	1800mm	150mm
FPU +Y A-Frame	650mm	150mm
FPU -Y A-Frame	1400mm	150mm
SOB Cone I/F	550mm	150mm
Photometer Connector Bracket	1800mm	250mm
SOB L1 I/F	1020mm	200mm
JFS	600mm	150mm

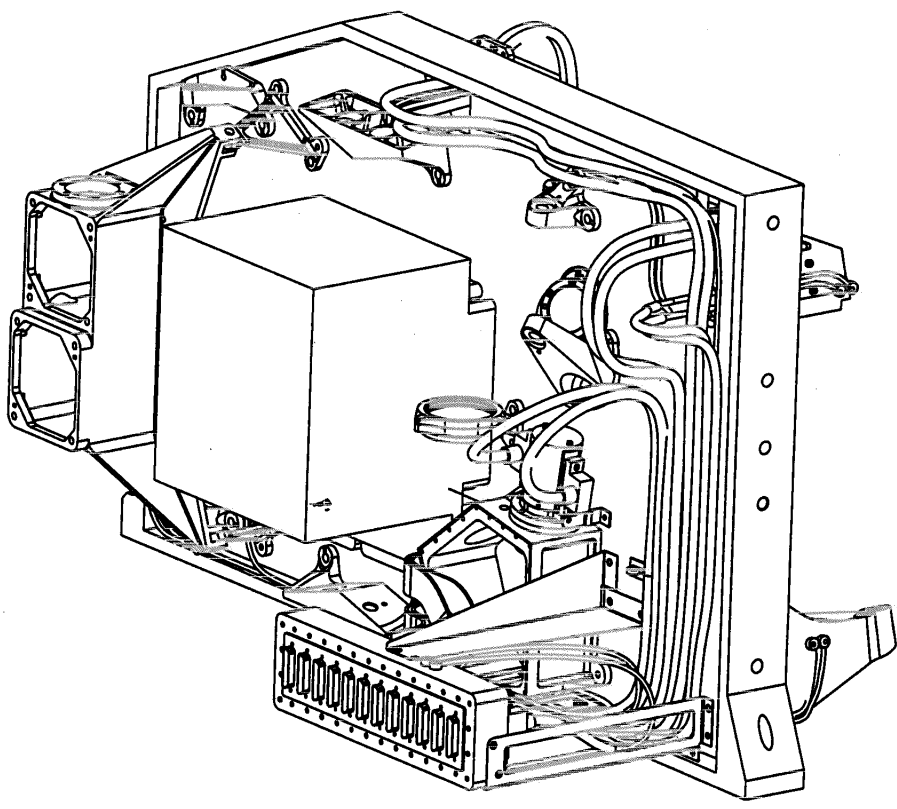
USED ON
SPIRE

DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES



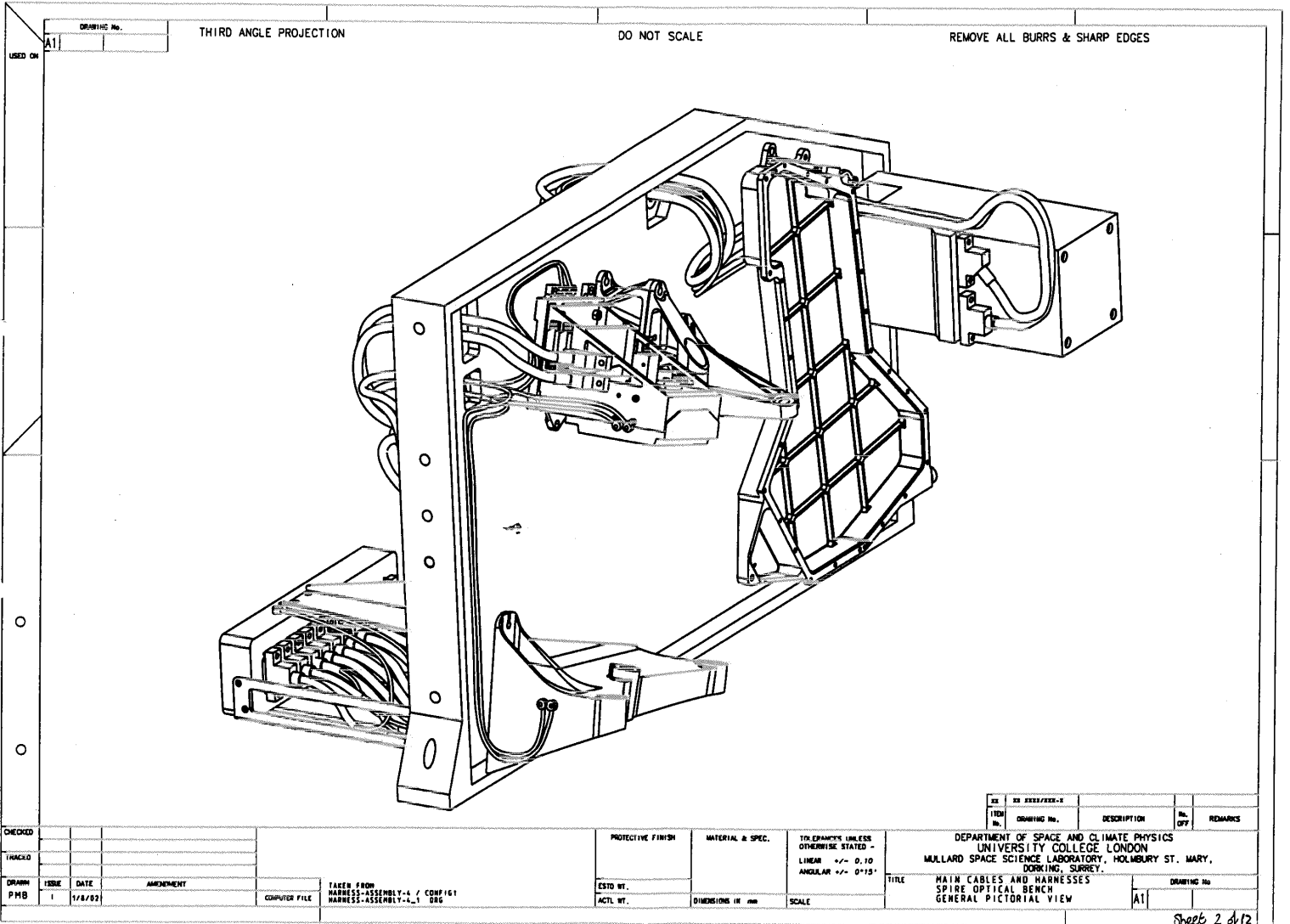
CHECKED				
TRACED				
DRAWN	ISSUE	DATE	AMENDMENT	
PMB	1	1/8/82		COMPUTER FILE

TAKEN FROM
HARNESS-ASSEMBLY-4 / CONF 161
HARNESS-ASSEMBLY-4 DRG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD BY.		
ACTL BY.	DIMENSIONS IN mm	SCALE

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	DR. OFF.	REMARKS
TITLE MAIN CABLES AND HARNESSES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW	DRAWING No. A1 5264 315	

Sheet 1 of 12



USED ON A1

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

CHECKED	DATE	BY

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT.		
ACTL WT.	DIMENSIONS IN mm	SCALE

ITEM No.	DRAWING No.	DESCRIPTION	QTY	REMARKS

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	
TITLE MAIN CABLES AND HARNESSSES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW	DRAWING No. A1

Sheet 2 of 12

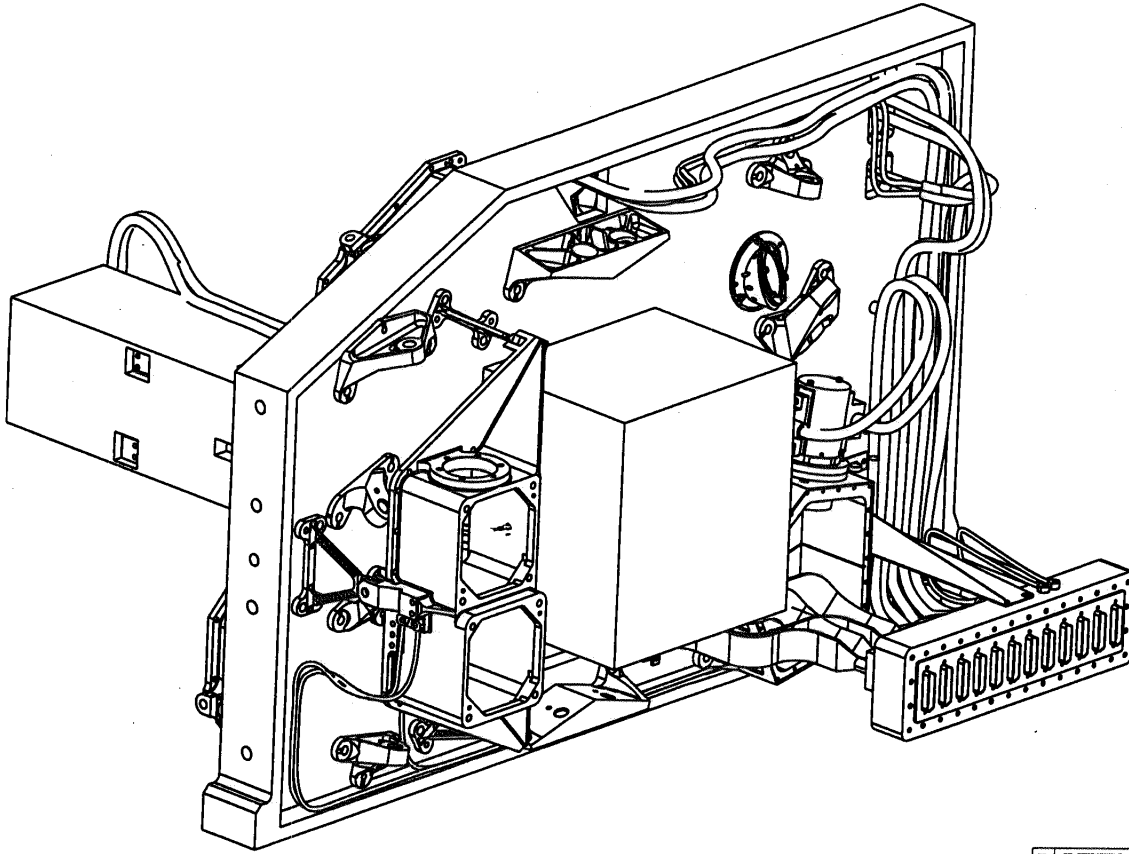
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



CHECKED			
TRACED			
DRAWN	ISSUE	DATE	AMENDMENT
PHB	1	1/8/92	

TAKEN FROM
HARNESS-ASSEMBLY-4 / CONFIG1
HARNESS-ASSEMBLY-4_2 DRG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.			
TITLE	MAIN CABLES AND HARNESSES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW		DRAWING No. A1 5264 315

Sheet 3 of 12

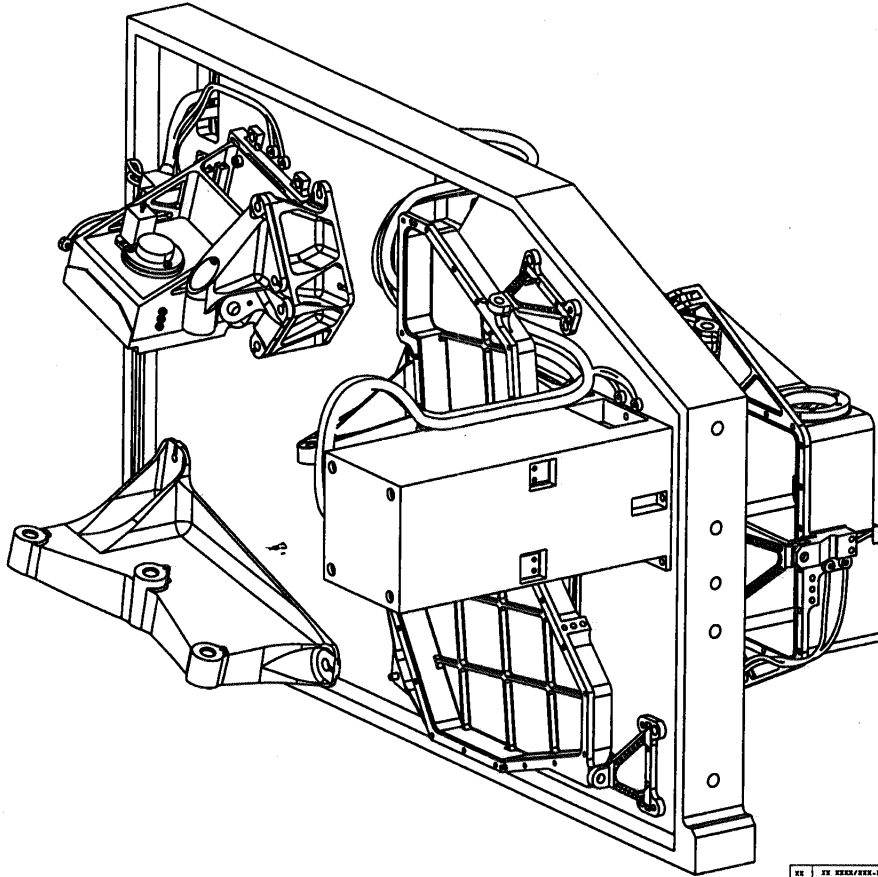
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



CHECKED			
TRACED			
DRAWN	ISSUE	DATE	AMENDMENT
PMB	1	1/8/82	
	COMPUTER FILE		

TAKEN FROM
HARNESS-ASSEMBLY-4 / CONFIG1
HARNESS-ASSEMBLY-4...3 DRG

PROTECTIVE FINISH

MATERIAL & SPEC.

TOLERANCES UNLESS OTHERWISE STATED -
LINEAR ± 0.10
ANGULAR $\pm 0^{\circ}15'$

ESTD WT.

ACTL WT.

DIMENSIONS IN mm

SCALE

REV.	BY	CHKD/REV. BY	DESCRIPTION	DATE	REMARKS

DEPARTMENT OF SPACE AND CLIMATE PHYSICS
UNIVERSITY COLLEGE LONDON
MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY,
DORKING, SURREY.

TITLE
MAIN CABLES AND HARNESSES
SPIRE OPTICAL BENCH
GENERAL PICTORIAL VIEW

DRAWING No.
A1 5264 315

Sheet 4 of 12

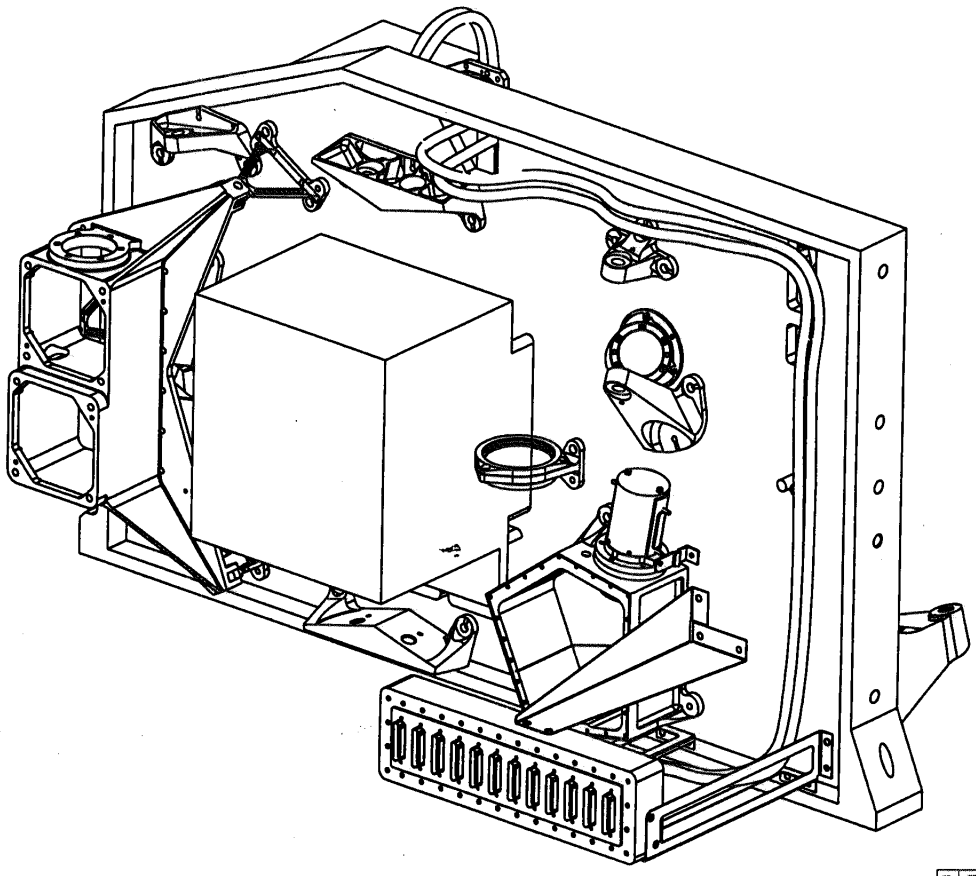
USED ON
SPIRE

DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES



CHECKED			
TRACED			
DRAWN	ISSUE	DATE	AMENDMENT
PMB	1	2/8/82	

TAKEN FROM
HARNESS-ASSEMBLY-A / CONFIG-COOLER
HARNESS-ASSEMBLY-A-COOLER DWG
MULTI SHEET DWG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR ± 0.10 ANGULAR $\pm 0.15^\circ$
ESTD WT.		
ACTL WT.	DIMENSIONS IN mm	SCALE

ITEM No.	XX XXXX/XXX-X	DESCRIPTION	No. OFT	REMARKS
DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.				
TITLE				DRAWING No.
COOLER CABLES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW				A1 5264 315

Sheet 5 of 12

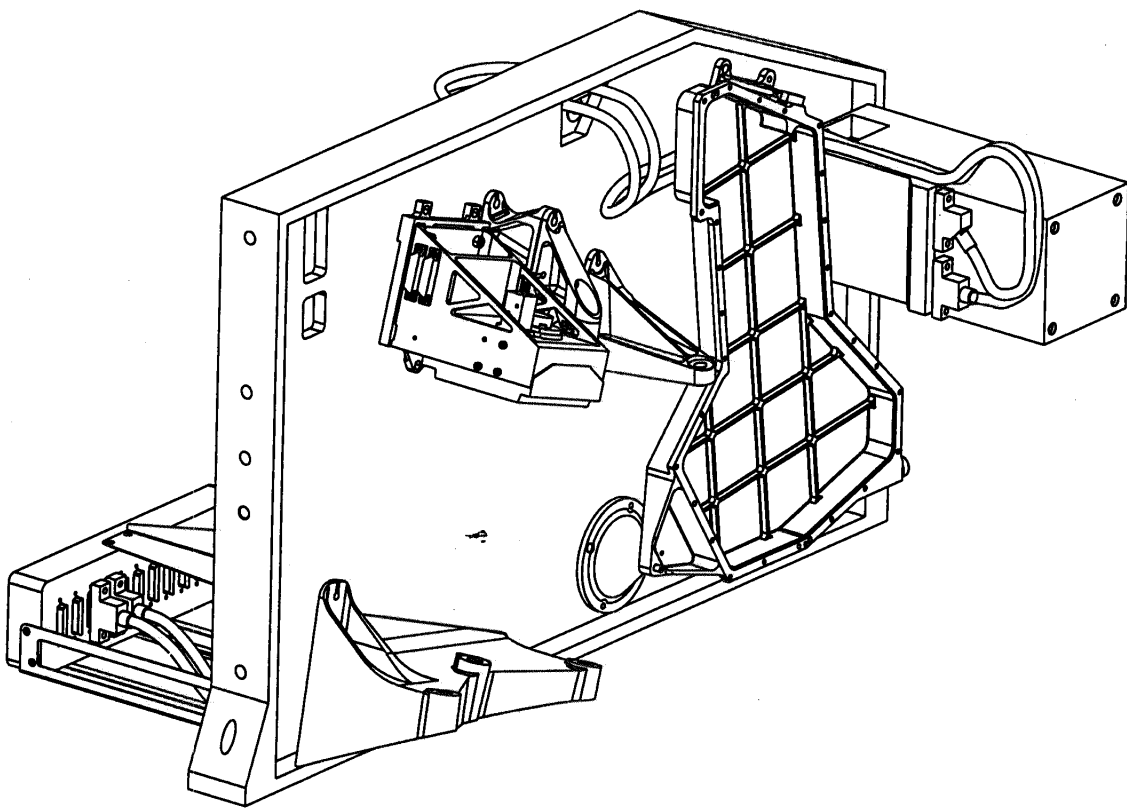
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



CHECKED			
TRACED			
DESIGN	ISSUE	DATE	AMENDMENT
PHB	1	27/8/92	

TAKEN FROM
HARNESS-ASSEMBLY-4 / CONF163-COOLER
HARNESS-ASSEMBLY-4-COOLER DRG
MULLI-SHEET DRG

COMPUTER FILE

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR ± 0.10 ANGULAR $\pm 0^{\circ}15'$
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.			
TITLE	COOLER CABLES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW	DRAWING No.	A1 5264 315

Sheet 6 of 12

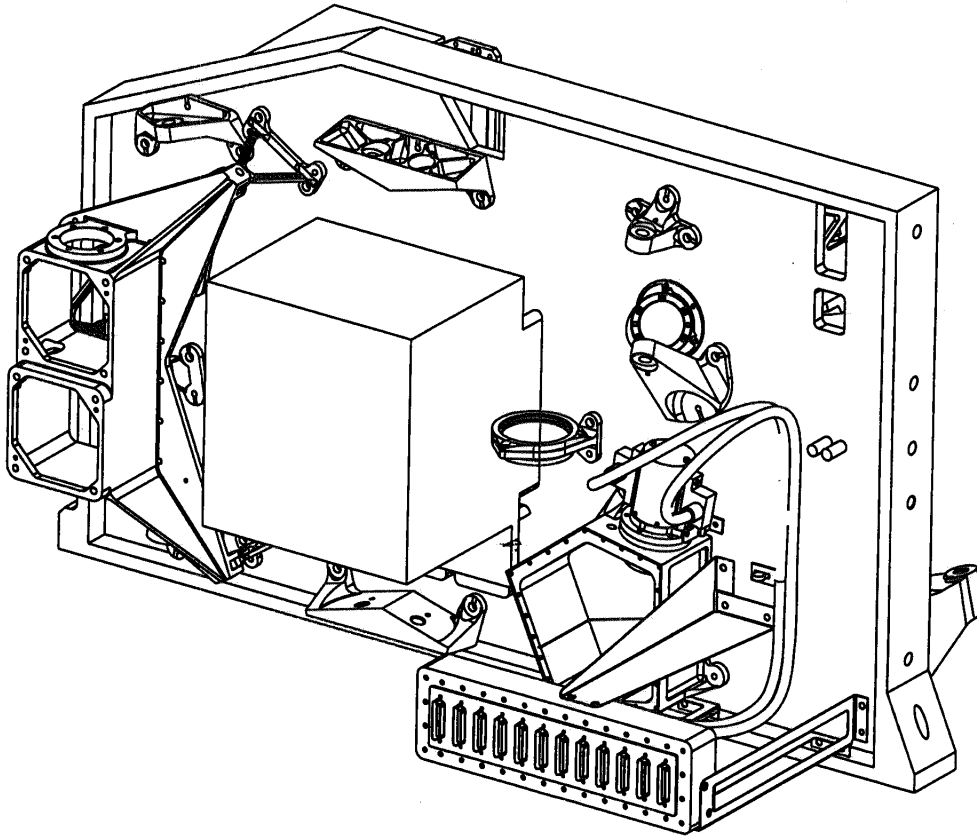
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



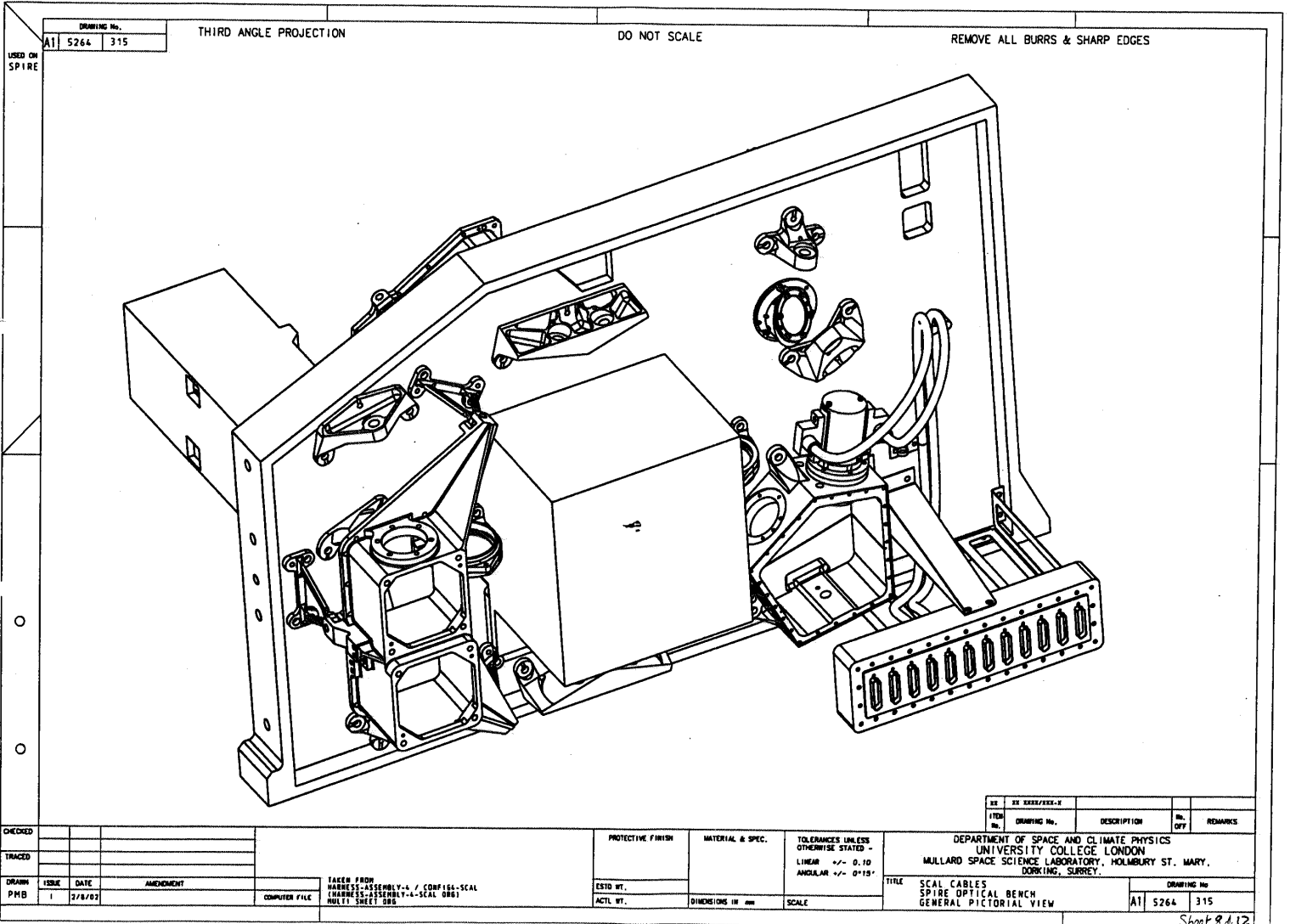
CHECKED				
TRACED				
DRAWN	12/8/92			
PMB	1	2/8/92		COMPUTER FILE

TAKEN FROM
HARNESS-ASSEMBLY-A / CONFIG-SCAL
(HARNESS-ASSEMBLY-A-SCAL.DWG)
MULTI SHEET DWG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR ± 0.10 ANGULAR $\pm 0.15^\circ$
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL WT.		

XX	XX	XX	XX	XX
ITEM No.	DRAWING No.	DESCRIPTION	No. OFF	REMARKS
DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.				
TITLE SCAL CABLES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW			DRAWING No. A1 5264 315	

Sheet 7 of 12



DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE

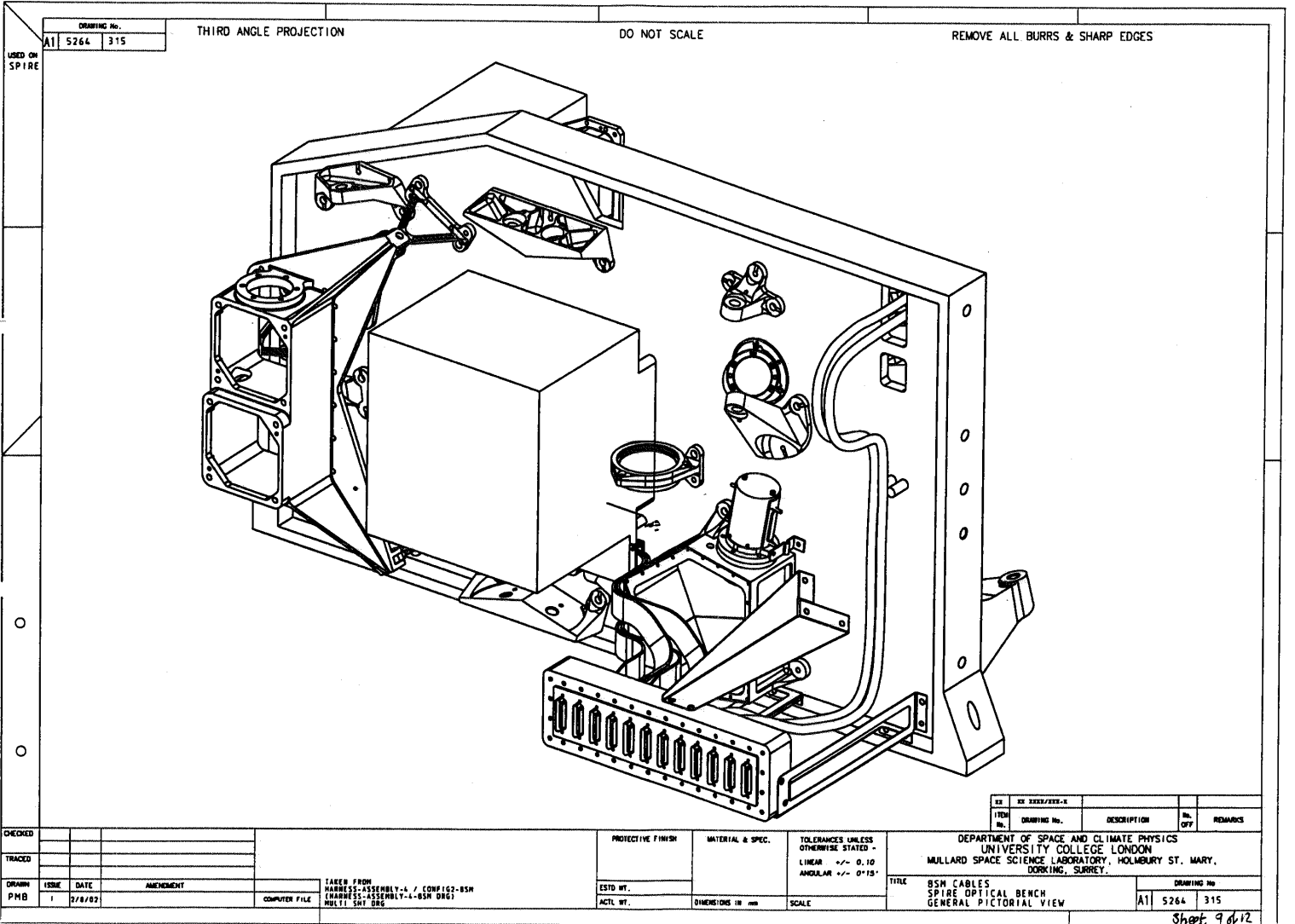
CHECKED			
TRACED			
DRAWN	PHB	1	2/8/02
ISSUE			
DATE			
AMENDMENT			
COMPUTER FILE			

TAKEN FROM
HARNESS ASSEMBLY-4 / CONF164-SCAL
(HARNESS ASSEMBLY-4-SCAL 000)
MULTI SHEET 000

PROTECTIVE FINISH		MATERIAL & SPEC.		TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD BY				
ACTL BY		DIMENSIONS IN mm	SCALE	

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	TITLE SCAL CABLES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW	DRAWING No. A1 5264 315
--	---	----------------------------

Sheet 8 of 12



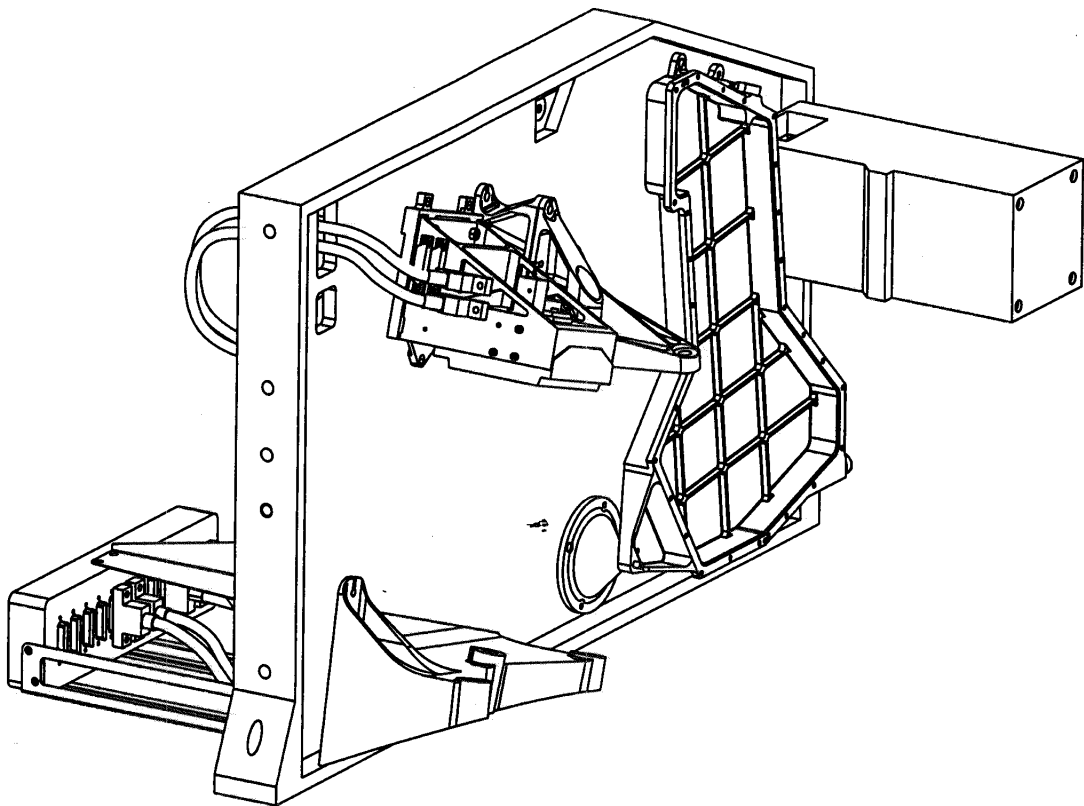
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



CHECKED			
TRACED			
DRAWN	ISSUE	DATE	AMENDMENT
PHB	1	2/8/02	

TAKEN FROM
HARNESS-ASSEMBLY-A / CONFIG2-BSH
(HARNESS-ASSEMBLY-A-BSH DRG)
MULTI-SW.DWG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR ± 0.10 ANGULAR $\pm 0.15^\circ$
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL. WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	TITLE	DRAWING No.
BSH CABLES SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEW	A1 5264 315	

Sheet 10 of 12

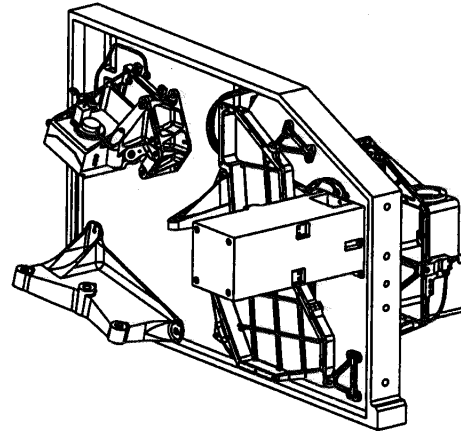
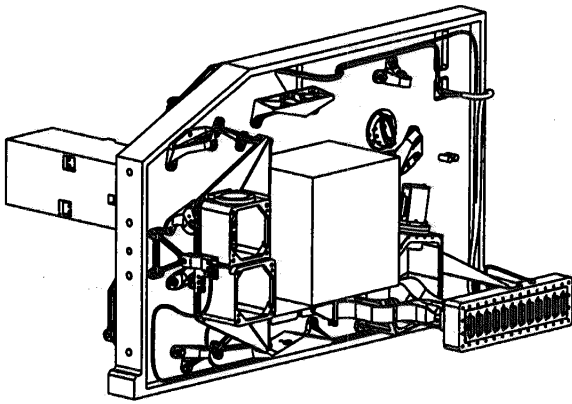
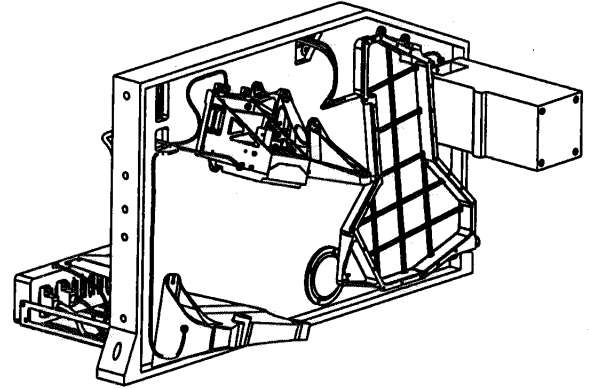
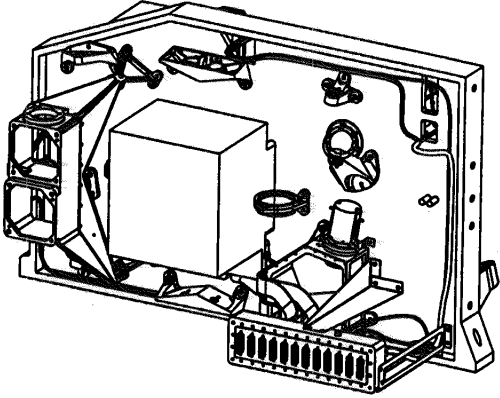
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



CHECKED			
TRACED			
DRAWN	PHB	DATE	2/8/02
		AMENDMENT	
		COMPUTER FILE	

TAKEN FROM
HARRISS-ASSEMBLY-4 / CONFIG-4-THERM-SUN
HARRISS-ASSEMBLY-4.5-THERM-SUN DRG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR ± 0.10 ANGULAR $\pm 0^{\circ}15'$
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.			
TITLE	THERMOMETRY PROBE AND SUN SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEWS	DRAWING No.	A1 5264 315
		Sheet 11 of 12	

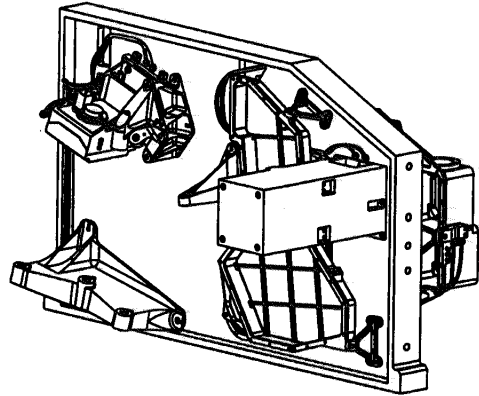
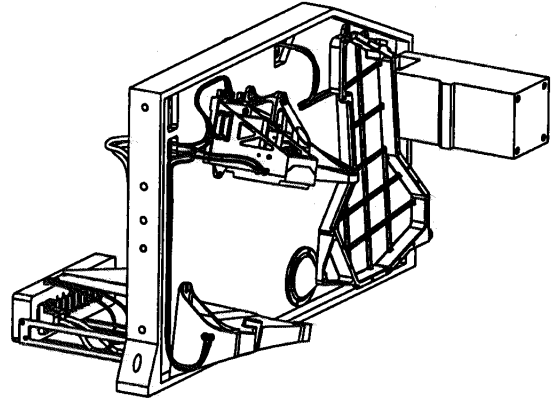
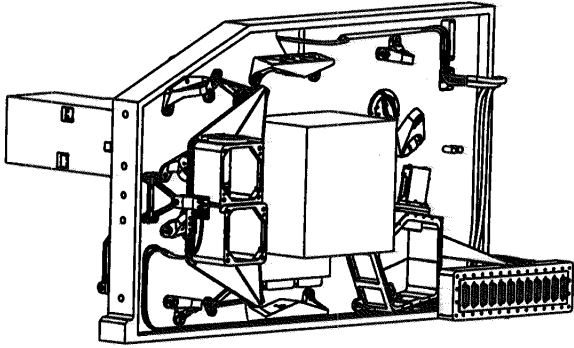
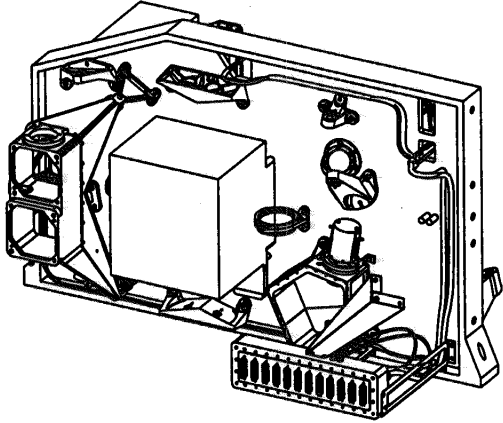
DRAWING No.
A1 5264 315

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE



CHECKED		
TRACED		

DRAWN	ISSUE	DATE	AMENDMENT
PMB	1	2/8/82	

TAKEN FROM
HARNES-ASSEMBLY-4 / COMICS-THERM-FLT
HARNES-ASSEMBLY-4-6-THERM-FLT DRG
COMPUTER FILE

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR \pm 0.10 ANGULAR \pm 0°15'
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL WT.		

EX 1704	XX HARN/ASSEMB-4		
NO.	DRAWING No.	DESCRIPTION	NO. OFF
DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.			
TITLE			DRAWING No.
THERMOMETRY PRISM AND REDUNDANT SPIRE OPTICAL BENCH GENERAL PICTORIAL VIEWS			A1 5264 315

Sheet 12 of 12

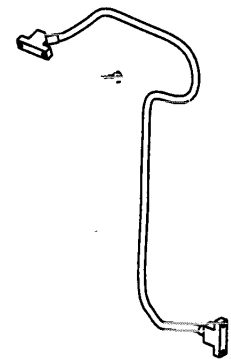
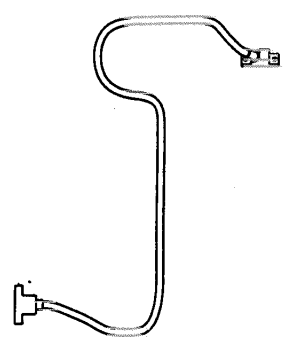
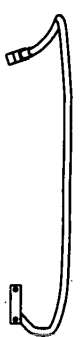
DRAWING No. A15264

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPRE



CHECKED	ISSUE	DATE	AMENDMENT	COMPUTER FILE

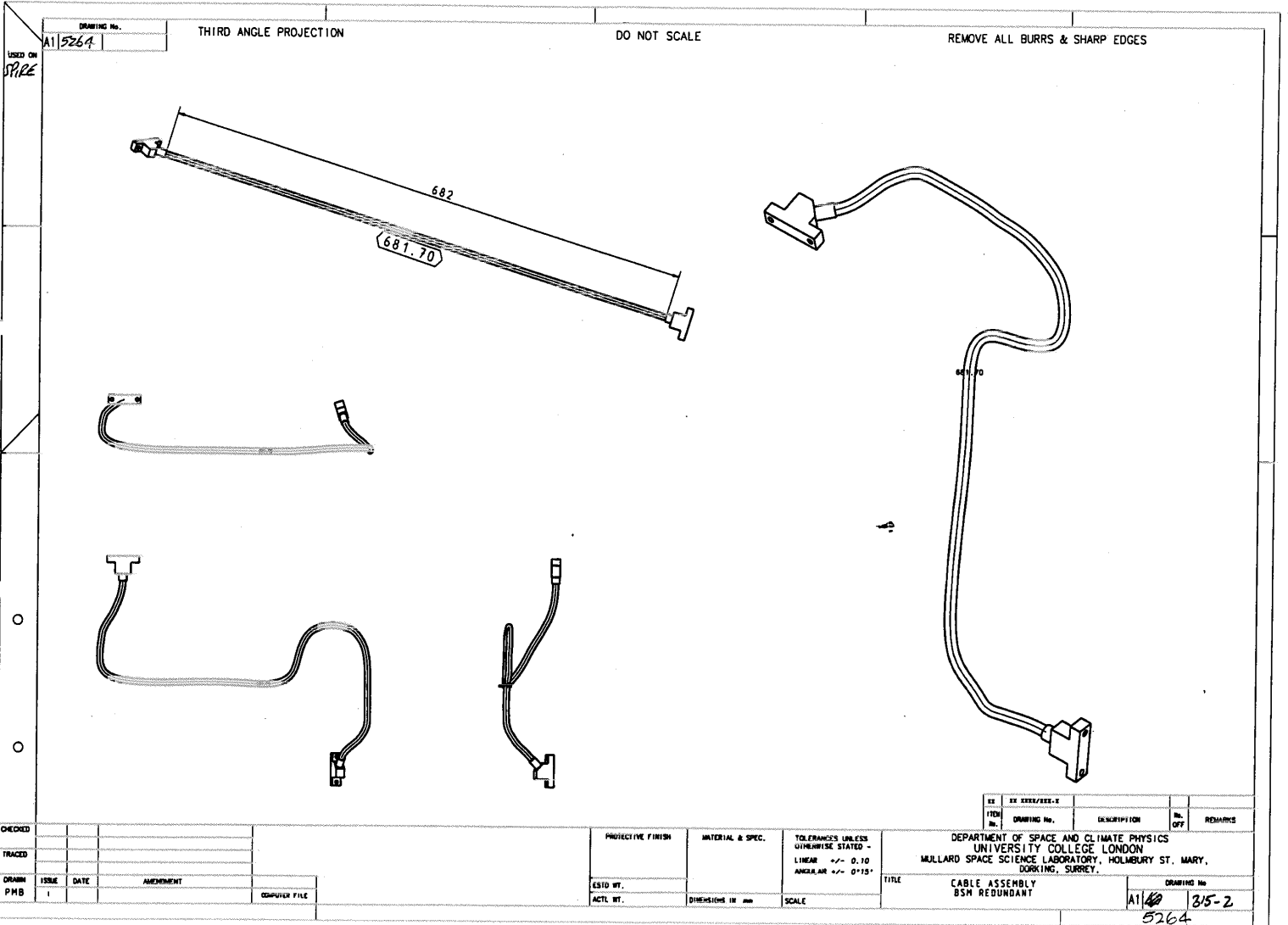
ESTD WT.	ACTL WT.

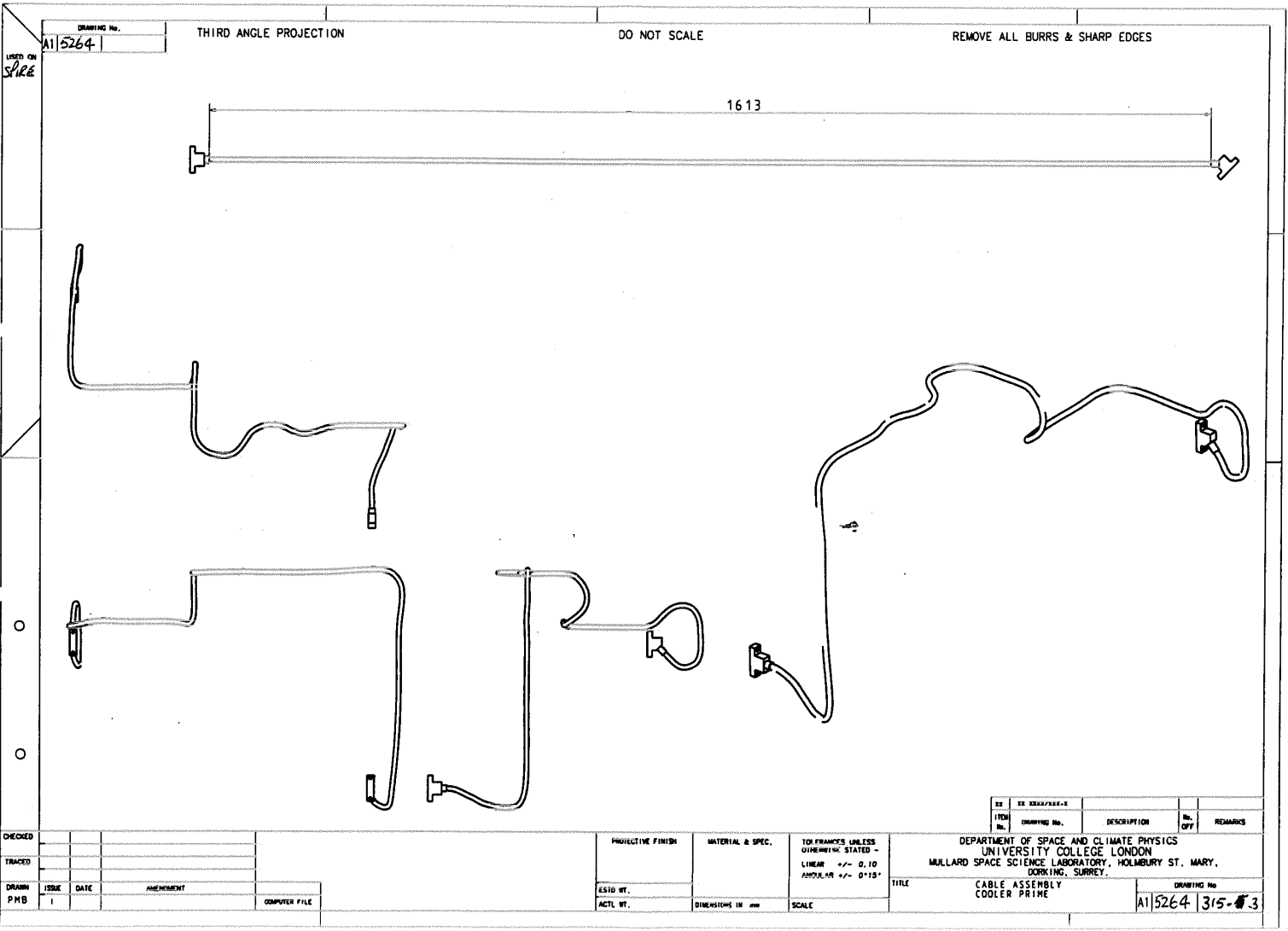
PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'

SCALE

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	TITLE	DRAWING No.
	CABLE ASSEMBLY BSM PRIME	A15264-315-1

REV	BY	DATE	DESCRIPTION	NO. OF	REMARKS





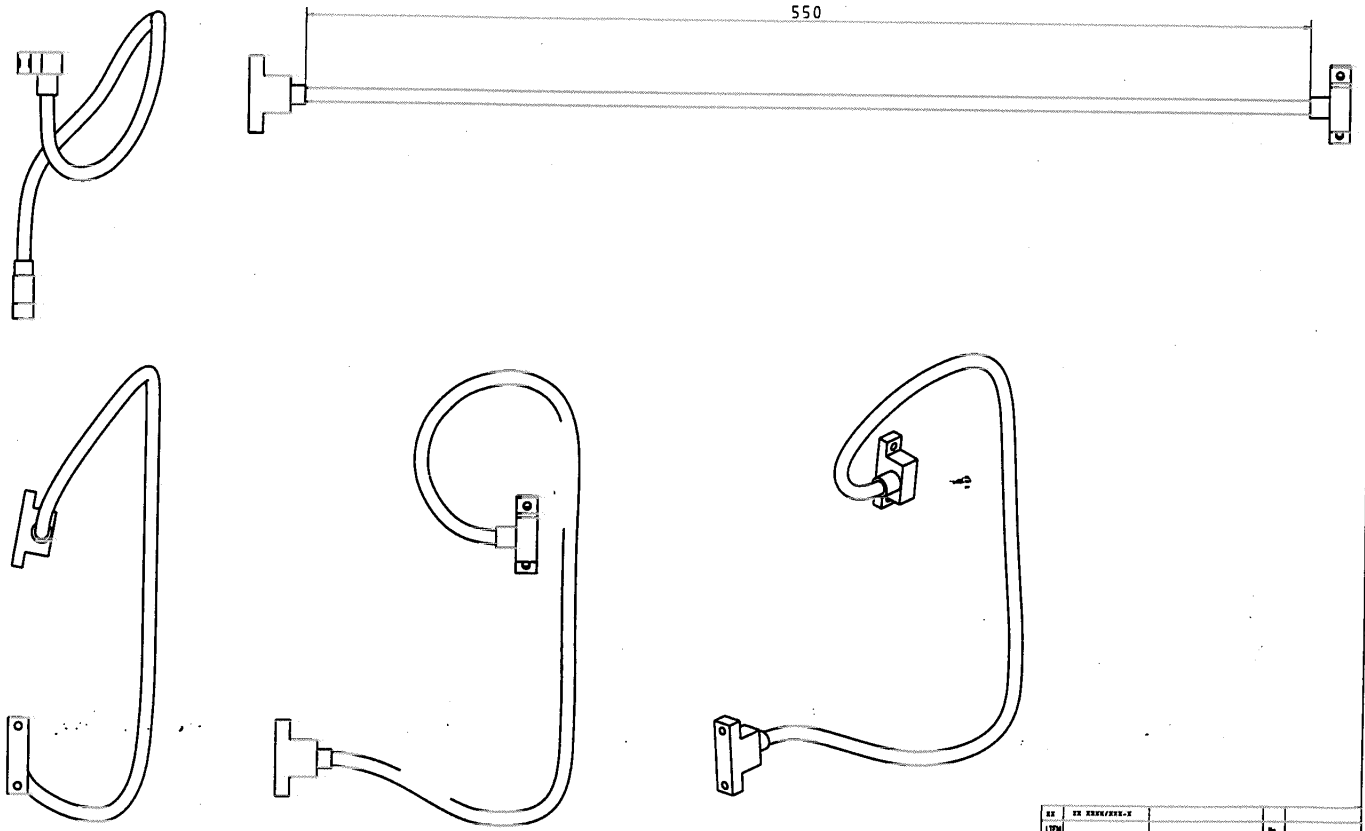
DRAWING No. A15264

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SARE



CHECKED			
TRACED			
DRAWN	ISSUE	DATE	AMENDMENT
PMB	1		
			COMPUTER FILE

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0.15
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	TITLE SCAL PRIME CABLE	DRAWING No. A15264/315-5
--	---------------------------	-----------------------------

REV	BY	DATE	DESCRIPTION	DR. OFF	REVISIONS
1					

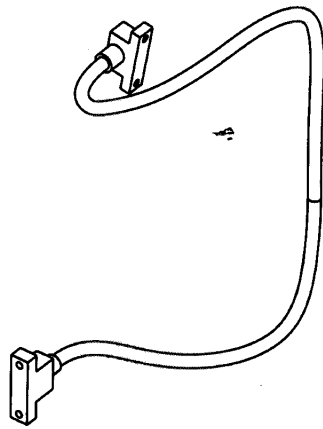
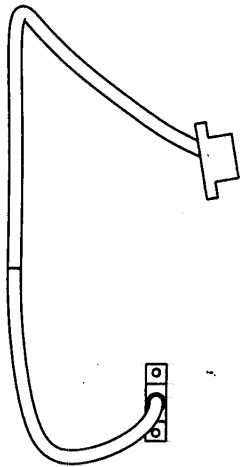
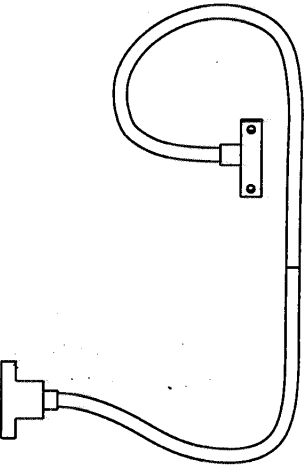
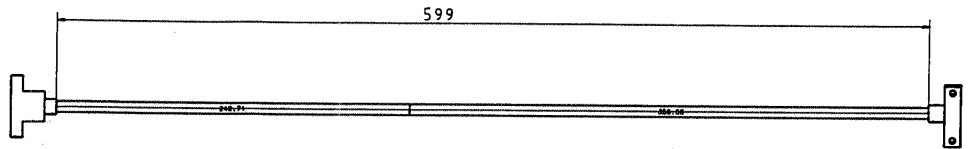
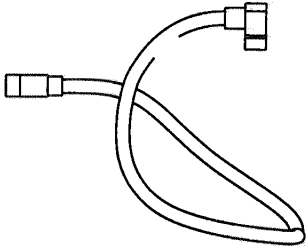
DRAWING No. A15264

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPARE

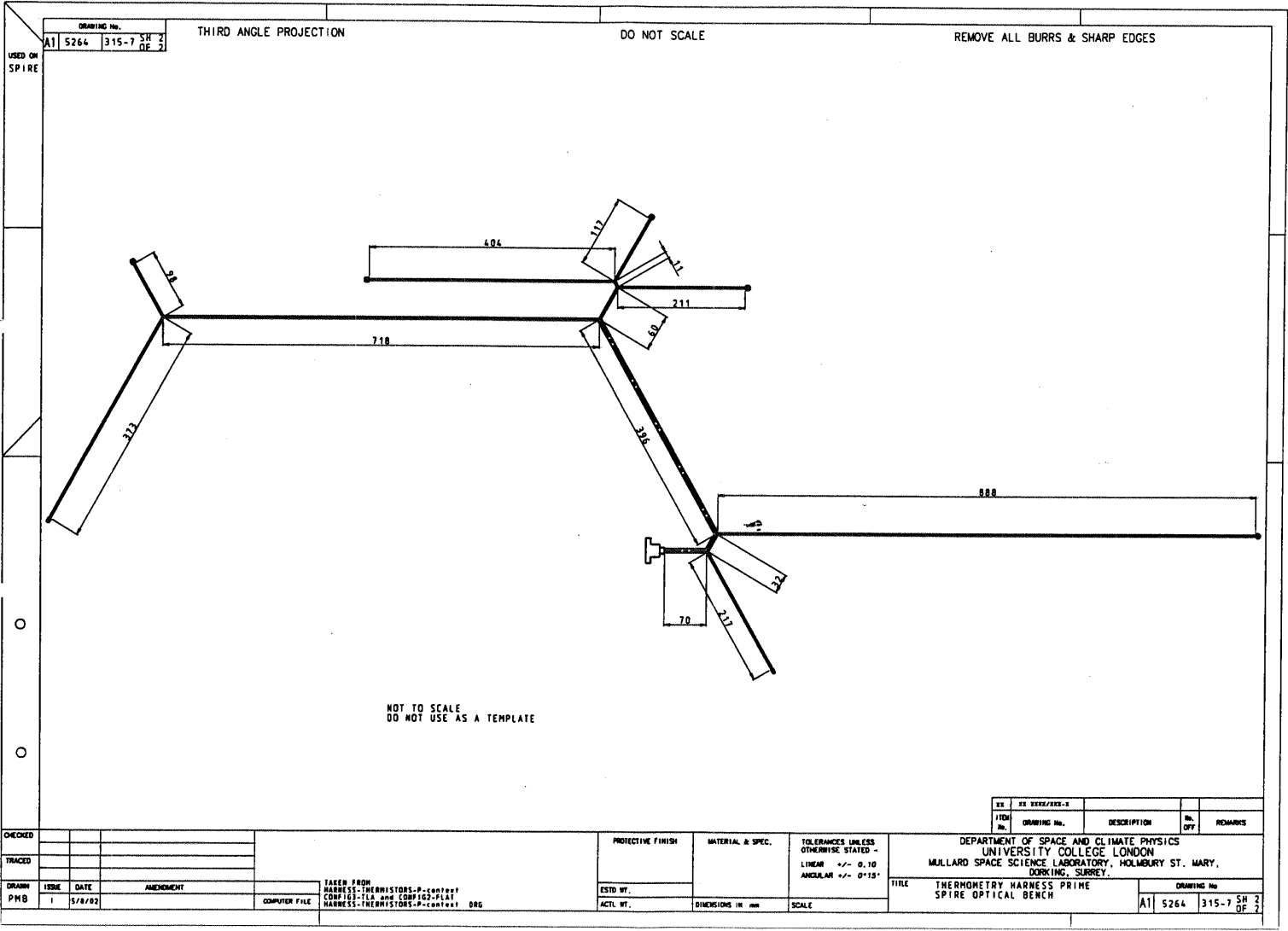


CHECKED			
TRACED			
DRAWN	ISSUE	DATE	AMENDMENT
PMB	1	29/11/82	COMPUTER FILE

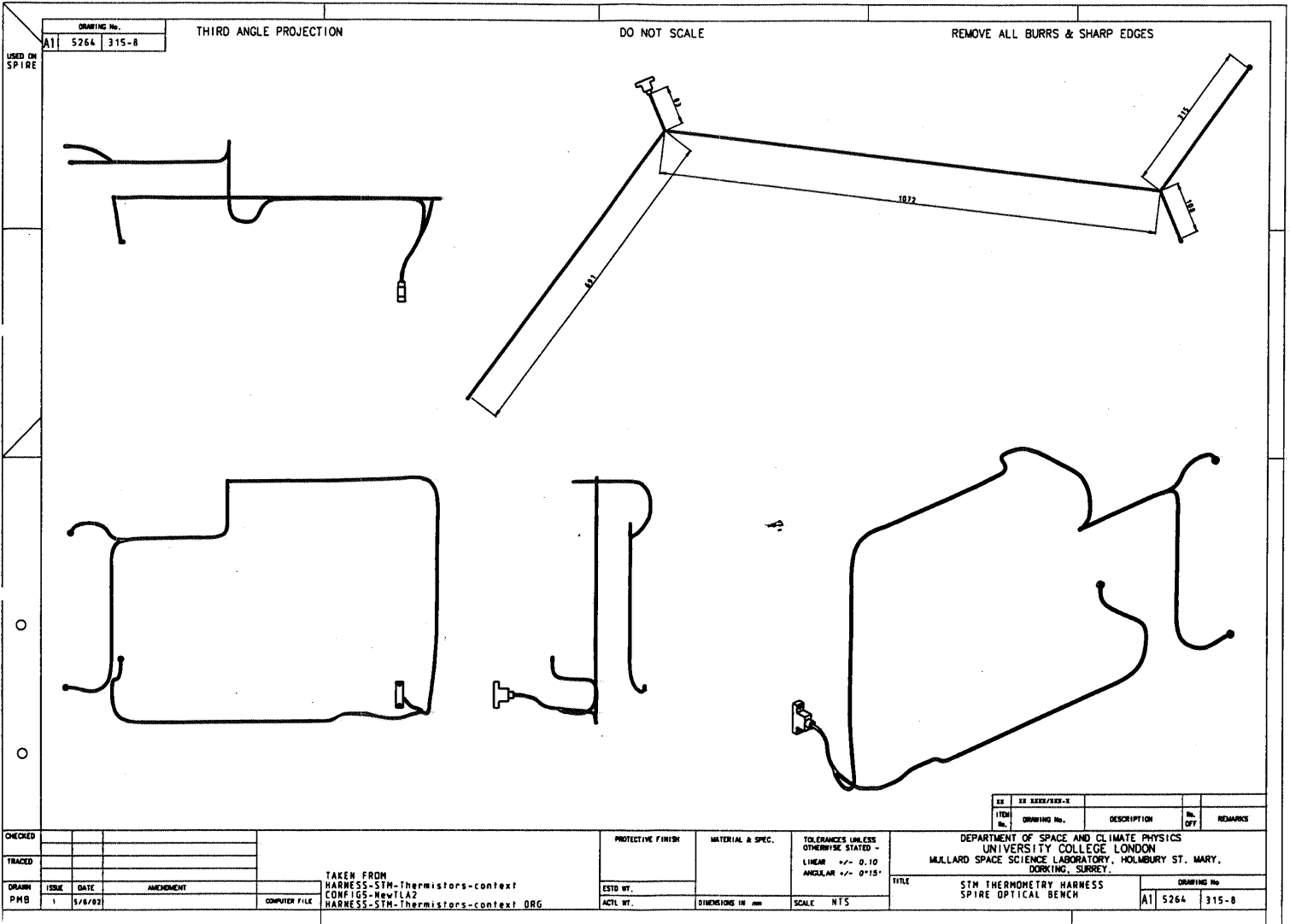
PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT.	DIMENSIONS IN mm	SCALE
ACTL. WT.		

REV	REV	REV/REV-D		
1				
150				
No.	DRAWING No.	DESCRIPTION	No.	REMARKS
			OFF	
DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.				
TITLE SCAL REDUNDANT CABLE			DRAWING No	
			A15264-315-6	

USED ON SPIRE	DRAWING No. A1 5264 315-7 SH 3 OF 3	THIRD ANGLE PROJECTION	DO NOT SCALE	REMOVE ALL BURRS & SHARP EDGES															
CHECKED TRACED DRAWN PHB	ISSUE 1	DATE 5/8/92	AMENDMENT COMPUTER FILE	TAKEN FROM HARNESS-THERMISTORS-P-contact CONF13-FLU and CONF13-FLAT HARNESS-THERMISTORS-P-contact DRG	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>PROTECTIVE FINISH</th> <th>MATERIAL & SPEC.</th> <th>TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'</th> </tr> <tr> <td>ESTD WT.</td> <td>DIMENSIONS IN mm</td> <td>SCALE</td> </tr> <tr> <td>ACTL WT.</td> <td></td> <td></td> </tr> </table>	PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'	ESTD WT.	DIMENSIONS IN mm	SCALE	ACTL WT.			<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: small;">DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.</td> <td style="font-size: small;">DRAWING No. A1 5264 315-7 SH 3 OF 3</td> </tr> <tr> <td style="font-size: small;">TITLE THERMOMETRY HARNESS PRIME SPIRE OPTICAL BENCH</td> <td></td> </tr> </table>	DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	DRAWING No. A1 5264 315-7 SH 3 OF 3	TITLE THERMOMETRY HARNESS PRIME SPIRE OPTICAL BENCH	
PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'																	
ESTD WT.	DIMENSIONS IN mm	SCALE																	
ACTL WT.																			
DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	DRAWING No. A1 5264 315-7 SH 3 OF 3																		
TITLE THERMOMETRY HARNESS PRIME SPIRE OPTICAL BENCH																			



DRAWING No. A1 5264 315-7 SH 2 OF 2		THIRD ANGLE PROJECTION		DO NOT SCALE		REMOVE ALL BURRS & SHARP EDGES	
USED ON SPIRE							
CHECKED		PROJECTIVE FINISH		MATERIAL & SPEC.		TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'	
TRACED		ESTD WT.		DIMENSIONS IN mm		SCALE	
DRAWN PHB		ISSUE 1		DATE 5/8/82		AMENDMENT	
COMPUTER FILE		TAKEN FROM HARNESSTHERMISTORS-P-context COMP163-TEL and COMP162-PLAT HARNESSTHERMISTORS-P-context DRG		DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.		TITLE THERMOMETRY HARNESSTHERMISTORS SPIRE OPTICAL BENCH	
						DRAWING No. A1 5264 315-7 SH 2 OF 2	



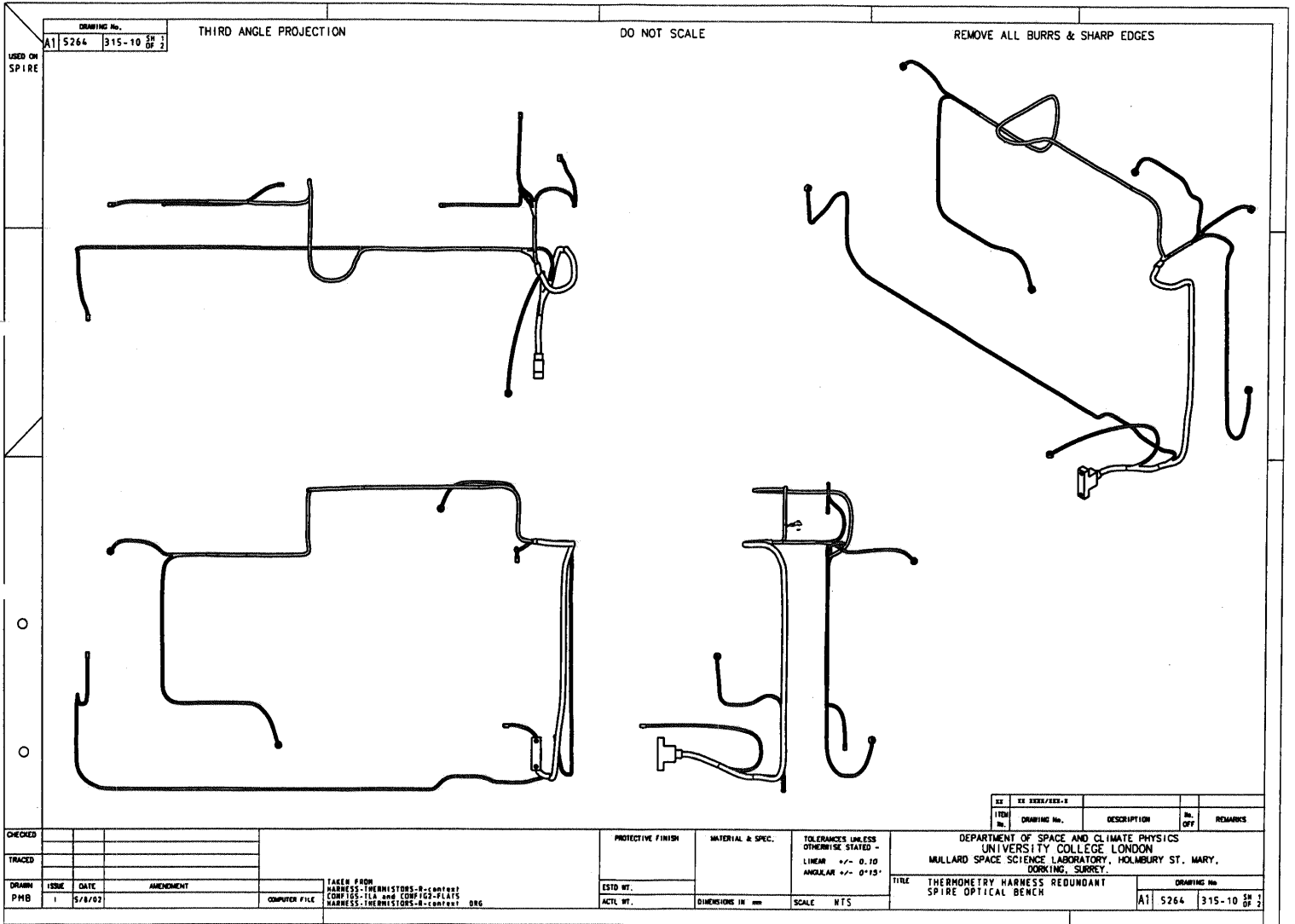
CHECKED			
TRACED			
DRW	ISSUE	DATE	AMENDMENT
PMB	1	5/8/82	

TAKEN FROM
 HARNESS-STM-Thermistors-context
 CONFIGS-NewTLA2
 HARNESS-STM-Thermistors-context ORG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT.	DIMENSIONS IN mm	SCALE NTS
ACTL WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	
TITLE	STN THERMOMETRY HARNESS SPIRE OPTICAL BENCH
DRAWING No.	A1 5264 315-8

ITEM No.	DRAWING No.	DESCRIPTION	IN. OFT	REMARKS
----------	-------------	-------------	---------	---------



DRAWING No.
A1 5264 315-10 SH 1
OF 2

THIRD ANGLE PROJECTION

DO NOT SCALE

REMOVE ALL BURRS & SHARP EDGES

USED ON
SPIRE

CHECKED			
TRACED			
DRAWN	PHB	5/8/02	
ISSUE	1	5/8/02	
DATE			
AMENDMENT			
COMPUTER FILE			

TAKEN FROM
HARNESS-THERMISTORS-B-content
COMP105-11A and COMP102-FLATS
HARNESS-THERMISTORS-B-content.DWG

PROTECTIVE FINISH	MATERIAL & SPEC.	TOLERANCES UNLESS OTHERWISE STATED - LINEAR +/- 0.10 ANGULAR +/- 0°15'
ESTD WT.	DIMENSIONS IN mm	SCALE NTS
ACTL WT.		

DEPARTMENT OF SPACE AND CLIMATE PHYSICS UNIVERSITY COLLEGE LONDON MULLARD SPACE SCIENCE LABORATORY, HOLMBURY ST. MARY, DORKING, SURREY.	TITLE THERMOMETRY HARNESS REDUNDANT SPIRE OPTICAL BENCH	DRAWING No. A1 5264 315-10 SH 1
--	---	------------------------------------

