PLB Model(s): MT410/MT410G

TYPE APPROVAL SUBMISSION
PREPARED FOR COSPAS/SARSAT

Approved: Craig DUNCAN
Position: Project Engineering Manager
Date: 4th December, 2006
Endorsement:

DEPLOYMENT PHOTOGRAPHS

1. INTRODUCTION

The MT410/410G Instruction Manual advises the owner as follows:

'Deploy the beacon in an upright position with the wire antenna vertical and well clear of any surrounding obstructions such as trees or rocks'

Further:

'Where on-person operation is unavoidable, choose an elevated position that also achieves good local clearance around the vertical wire antenna.'

2. PHOTOGRAPH

2.1 Preferred Deployment Configuration

Picture 1 Optimal deployment example

Picture 2 Optimal deployment example

2.2 Non-preferred On Person Deployment

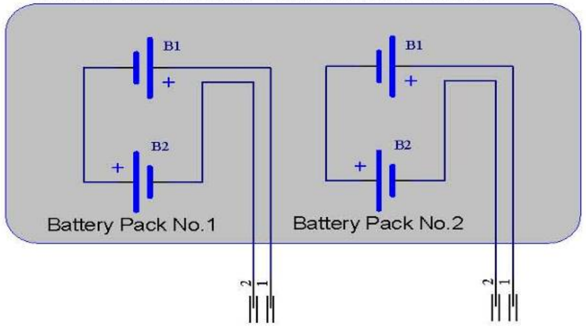
In some circumstances the preferred on ground deployment is not practical. On-person deployments which while non-optimal can reasonably be expected to deliver satisfactory levels of performance. A large number of potential configurations are possible, ranging from retaining the unit to a life vest through to the example given in Picture 3

Picture 3 An example of on-person deployment

THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN MAY NOT BE COPIED, USED OR DISCLOSED IN WHOLE OR IN PART EXCEPT WITH PRIOR WRITTEN PERMISSION OF STANDARD COMMUNICAIONS PTY LTD OR IF THIS DOCUMENT HAS BEEN PRODUCED UNDER CONTRACT WITH ANOTHER PARTY, AS EXPRESSLY AUTHORISED UNDER THAT CONTRACT. IT IS SUPPLIED WITHOUT LIABILITY FOR ERRORS OR OMISSIONS.

REV	ECO No	DETAILS	BY	DATE
A	CREATE	-------	CJWD	03-12-2006

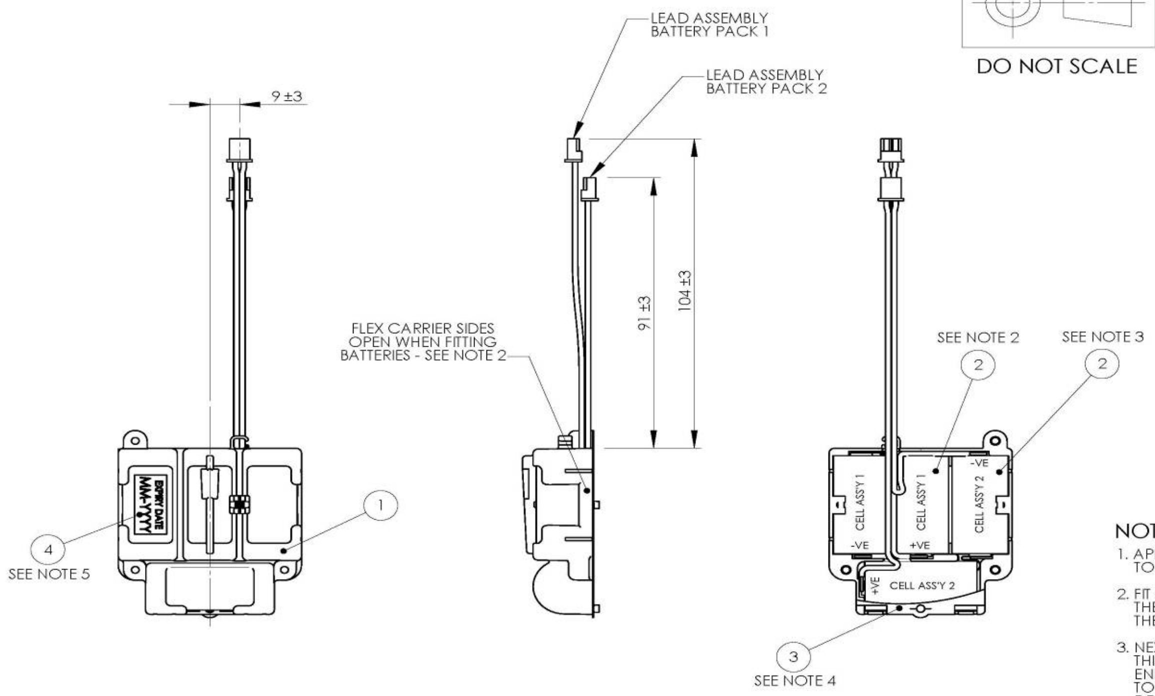
Battery Pack Assembly - 080019 / 97MT410BAT



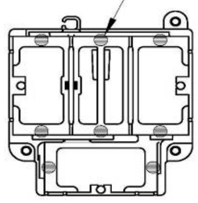
DRAWING TO AUSTRALIAN STANDARD AS1100	DRAWN BY C. J. W. DUNCAN	STANDARD COMMUNICATIONS PTY LTD 6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814
UNLESS OTHERWISE STATED RESISTANCE IS IN OHMS CAPACITANCE IS IN FARADS INDUCTANCE IS IN HENRYS VOLTAGE IN VOLTS AND CURRENT IN AMPERES ALL DIMENSIONS ARE IN MILLIMETRES	CHECKED BY APPROVED BY CONTRACTOR	TITLE CIRCUIT DIAGRAM BATTERY PACK ASSEMBLY - MT410/G
	CONTRACTOR PART NO	PART NO 080019 / SCALE / DRAWING NO / A4
	SOURCE APPLIC:	NEXT ASSY: / SHEET 1 OF 1 / FILE 080019.Sch

REV	ECO No	DETAILS	BY	DATE
C	-----	CELL CONFIG NOW 2 X 2 WAS 4 X 1	C.M.	04/04/06
D	-----	NOTES ALTERED	C.M.	23/06/06
1	-----	RAISED TO NUMERIC ISSUE	C.M.	18/08/06

DO NOT SCALE



PART SECTION SHOWING BATTERY PACKS FITTED TO BATTERY CARRIER & THE ROUTING OF THE LEADS



VIEW OF ITEM 1 - BATTERY CARRIER PRIOR TO INSERTING CELLS

NOTES

1. APPLY SILICONE P/N 030119 TO BATTERY CARRIER ITEM 1 IN THE 8 POSITIONS SHOWN PRIOR TO THE FITTING OF THE CELL ASSEMBLIES (ITEMS 2).
2. FIT CELL ASSEMBLY 1 (ITEM 2) INTO THE BATTERY CARRIER (ITEM 1) BY FLEXING THE SIDE OF THE CARRIER ALLOWING THE CELLS TO SLIP INTO THEIR RESPECTIVE RECESSES, THEN ROUTE THE LEAD AS SHOWN.
3. NEXT TAKE CELL ASSEMBLY 2 (ITEM 2) AND FIT ITS CELLS INTO THEIR RECESSES IN THE CARRIER, THIS WILL REQUIRE THE FIGURE OF 8 WIRE TO BE SEPARATED INTO TWO WIRES AT THE CELL END OF THE LEAD ALLOWING THE CELLS TO BE POSITIONED AT 90 DEGREES WITH RESPECT TO EACH OTHER AND INSERTED INTO THE CARRIER AS SHOWN. THEN ROUTE THE LEAD AS DEPICTED WITH THE EXCESS LENGTH OF THE LEAD BEING HOUSED WITHIN THE BATTERY CARRIER (ITEM 1).
4. FIT INSULATOR (ITEM 3) ONTO THE 3 PINS OF THE BATTERY CARRIER BY ALIGNING THE 3 HOLES IN THE INSULATOR AND PUSHING THE INSULATOR HARD UP TO THE FACE OF THE CARRIER. THE INSULATOR IF FITTED CORRECTLY SHOULD BE SELF RETAINING AND NOT REQUIRE ANY OTHER MEANS OF RETENSION.
5. AFFIX THE SELF ADHESIVE LABEL (ITEM 4 OR EQUIVALENT) TO THE CELL IN APPROXIMATE POSITION AS SHOWN. THE DATE ON THE LABEL IS THE EXPIRY DATE OF THE BATTERY PACK ASSEMBLY. THIS DATE IS THE CELL MANUFACTURE DATE PLUS 7 YEARS, USING THE OLDEST CELL WITHIN THE BATTERY PACK IF ARE NOT ALL THE SAME. IT IS THE RESPONSIBILITY OF THE BATTERY PACK ASSEMBLER TO ENSURE THAT THE CORRECTLY DATED LABELS ARE FITTED.

ASSEMBLY No: 080019 (FOR OUT-SOURCED ASSEMBLY)
ASSEMBLY No: 97MT410BAT (FOR IN-HOUSE ASSEMBLY)

ITEM No	QTY	PART No	DESCRIPTION	DWG No
1	1	61A0468	BATTERY CARRIER - MT410	42392
2	2	080017	CELL ASSEMBLY - MT410	42761
3	1	23D0005	BATTERY PACK INSULATOR - MT410	42763
4	1	400656	LABEL, BATTERY PACK EXPIRY DATE	42764

DRAWING TO AUSTRALIAN STANDARD AS1100

UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- 1
DECIMAL NUMBERS +/- 0.5
ANGULAR TOLERANCE:- IN DEGREES +/- 1°
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING

DRAWN BY	C.MADDOX	12/08/05
CHECKED BY	C.DUNCAN	18/08/06
APPROVED BY	C.DUNCAN	18/08/06
CONTRACTOR		
CONTRACTOR PART NO		

STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814

TITLE: BATTERY PACK ASSEMBLY - MT410

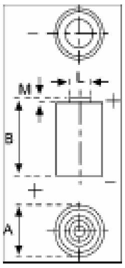
PART NO	SCALE	DRAWING NO	
SEE TABLE	1:1	42757-1	A2
NEXT ASSY: 97MT410COM	SHEET 1 OF 1	FILE: 42757-1	

power one

CR 123 A

Lithium Manganese Dioxide

Data Sheet



Type Number	6205	
Designation IEC	CR 17345	
System	Li-Manganese dioxide / Organic Electrolyte	
UL Recognition:............................	MH 13654 (N)	
Nominal Voltage	3 V	
Typical Capacity C	1500 mAh	
Load 200 Ohm, at 20°C down to 2 V		
Weight (approx.)	17 g	
Volume	7 ccm	
Coding..	TBA	
Temperature Ranges	min	max.
Storage	-20°C	65°C
Discharge	-20°C	65°C
Dimensions	min	max.
Diameter (A)	16	17
Height (B)	33,9	34,5
Shoulder Diameter[L].........................	6,4	
Shoulder Height [M]...........................	1,29	
Segment	Electronic	
Main Applications	Photo Electronic Devices	

Typical Capacities (at 20°C)

Discharge Type	**Load**	**End Voltage:**	**2.0 V**
Continuous 24h/d,7d/w	200 Ω	Time: Capacity [mAh]:	100 h 1500

All Data contained herein is for single cells
For battery applications, performance data may vary from single cell data, depending on specific battery configuration

VARTA Microbattery GmbH, Daimlerstr. 1, D-73479 Ellwangen/Jagst
Tel.: (+49) 7961/921-0, Telefax: (+49) 7961/921-553

Subject to change without prior notice!
Date of Issue: 2004-12-15

VARTA DIE BATTERIE-EXPERTEN

Material Safety Data Sheet

6205
Photo

Type Designation	6205 (CR 123 A)
Designation IEC	CR 17345
System	Li-MnO_2 (org. elyt.)
Nominal Voltage	3 V
Weight, approx.	17 g

1. INGREDIENTS

1.1 ACTIVE MATERIALS	APPROXIMATE PERCENT OF TOTAL WEIGHT (%)
Manganese Dioxide (MnO_2)	32.8
Organic Electrolyte	12.9
Lithium Metal (Li)	2.9

1.2 PASSIVE MATERIALS		APPROXIMATE PERCENT OF TOTAL WEIGHT (%)
BASE METAL	stainless steel	48.8
OTHERS	plastic	2.7

This product conforms to the requirements of IEC Publication 60086-2.

VARTA Gerätebatterie GmbH, Daimlerstr. 1, D-73479 Ellwangen/Jagst
Tel.: (+49) 7961/ 83-0, Telefax: (+49) 7961/83-440

2. SAFETY GUIDELINES

General: Safety precautions during handling of batteries

When used correctly, primary batteries with aqueous electrolyte provide a safe and dependable source of power. However, if they are misused or abused, leakage or in extreme cases, explosion and/or possibly fire may result.

➢ **Always take care to insert batteries correctly with regards to polarity (+ and -), marked on the battery and the equipment.**

Batteries which are incorrectly placed into equipment may be short-circuited, or charged. This can result in a rapid temperature rise causing venting, leakage and explosion.

➢ **Do not short-circuit batteries**

When the positive (+) and negative (-) terminals of a battery are in direct contact with each other, the battery becomes short circuited. For example, batteries lying on top of each other or mixed together, can be –short-circuited. This can result in venting and leakage.

➢ **Do not charge batteries**

Attempting to charge a primary battery may cause internal gas and/or heat generation resulting in venting, leakage, explosion and/or possibly fire.

➢ **Do not force discharge batteries**

When batteries are force discharged with an external power source, the voltage of the battery will be forced below its design capability and gases will be generated inside the battery. This may result in venting, leakage and explosion.

➢ **Do not mix batteries (When replacing batteries, replace all of them at the same time with new batteries of the same brand and type).**

When batteries of different kinds are used together, of new and old batteries are used together, some batteries may be overdischarged due to a difference of voltage or capacity. This can result in venting, leakage or explosion.

➢ **Exhausted batteries should be immediately removed from the equipment and disposed of**

When discharged batteries are kept in the equipment for a long time, electrolyte leakage may occur causing damage to the appliance.

➢ **Do not heat batteries**

When a battery is heated, venting, leakage and explosion may occur.

➢ **Do not directly solder batteries**

When a battery is directly soldered, it may be damaged by heat. This may cause internal short-circuiting and may result in venting, leakage and explosion.

➢ **Do not dismantle batteries**

When a battery is dismantled, contact with the components may result in personal injury.

➢ **Do not deform batteries**

Batteries should not be crushed, punctured, or otherwise mutilated. Such abuse may result in leakage or explosion.

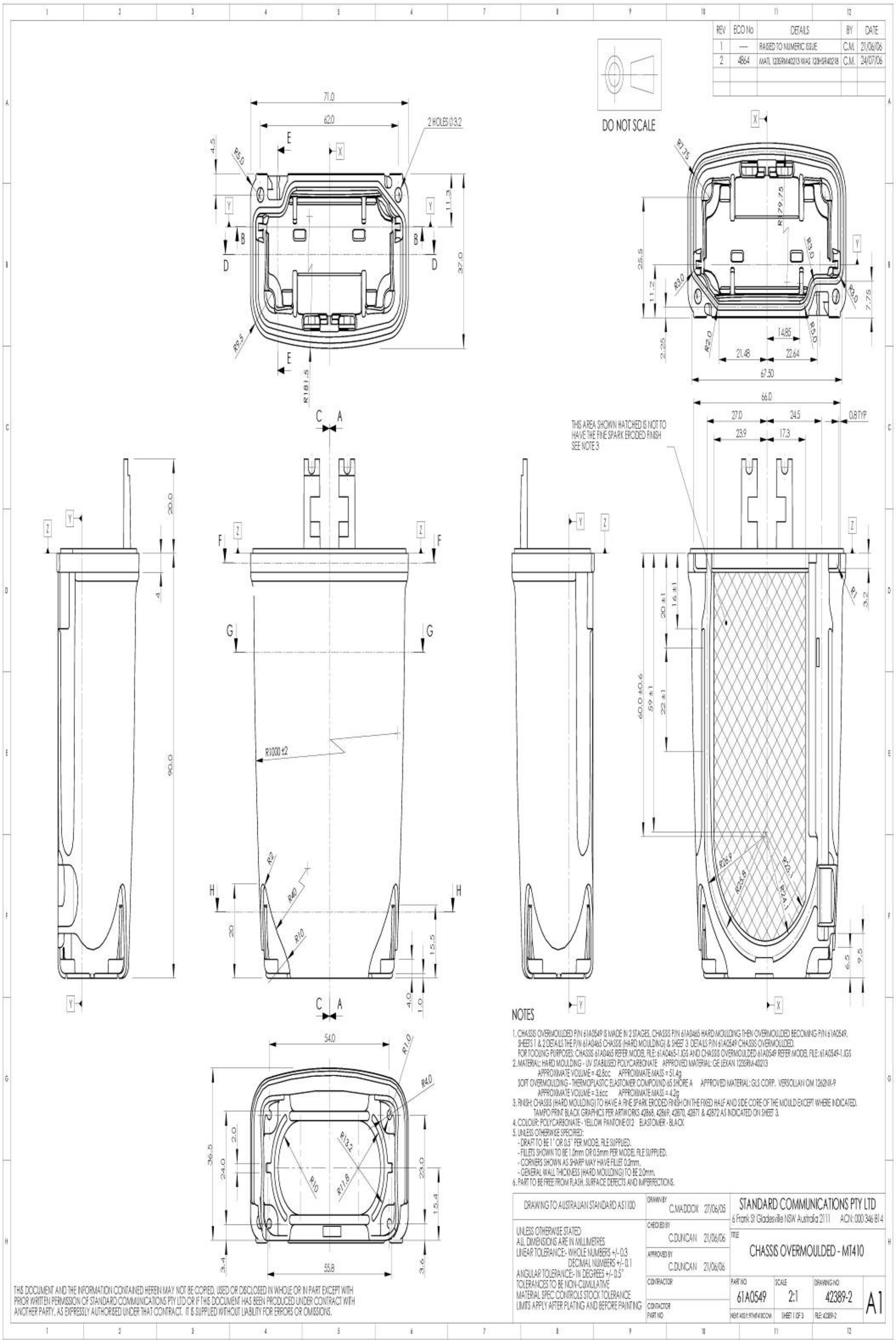
➢ **Do not dispose of batteries in fire**

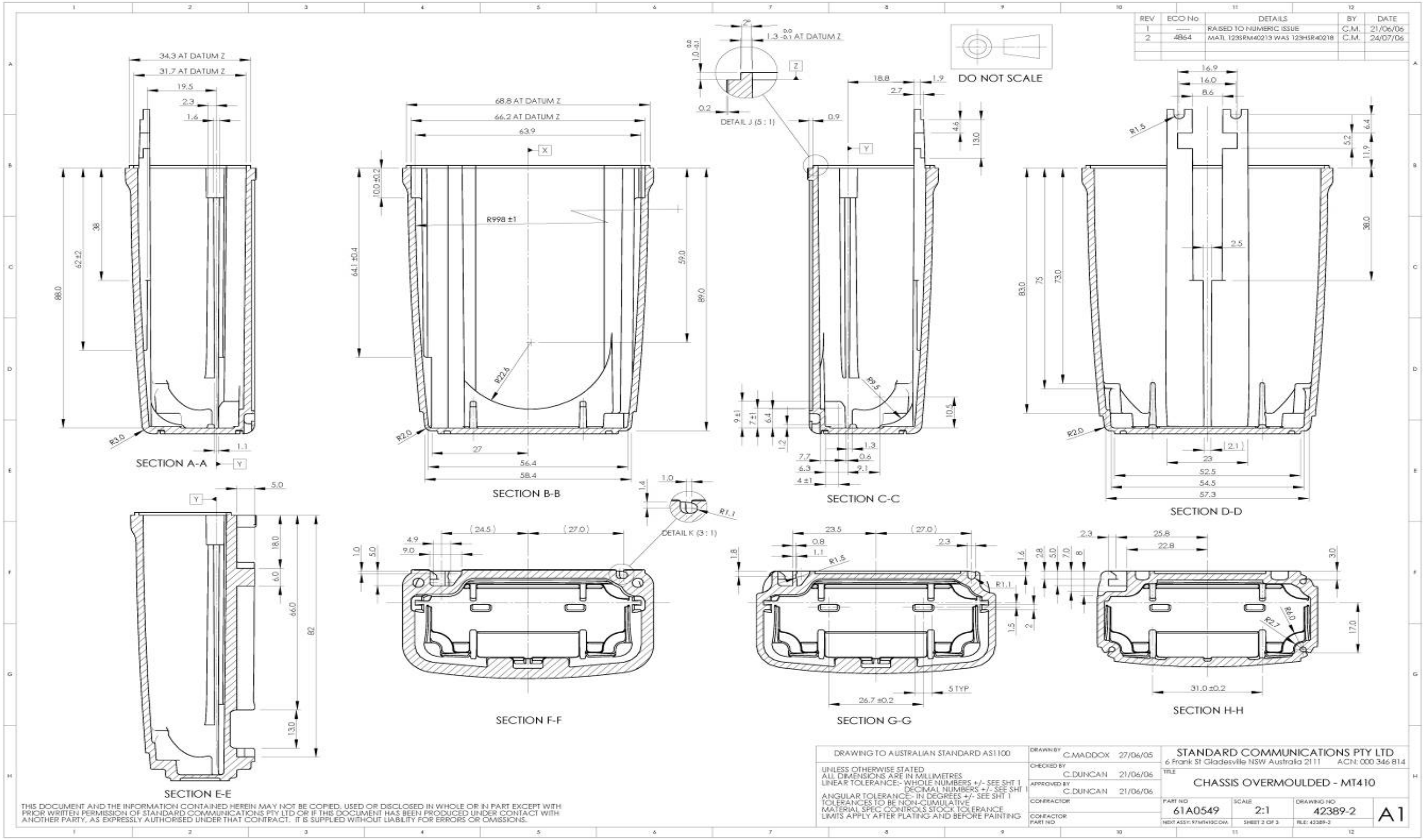
When batteries are disposed of in fire, the heat build-up may cause explosion. Do not incinerate batteries except in a controlled furnace.

➢ **Do not allow children to replace batteries without adult supervision**

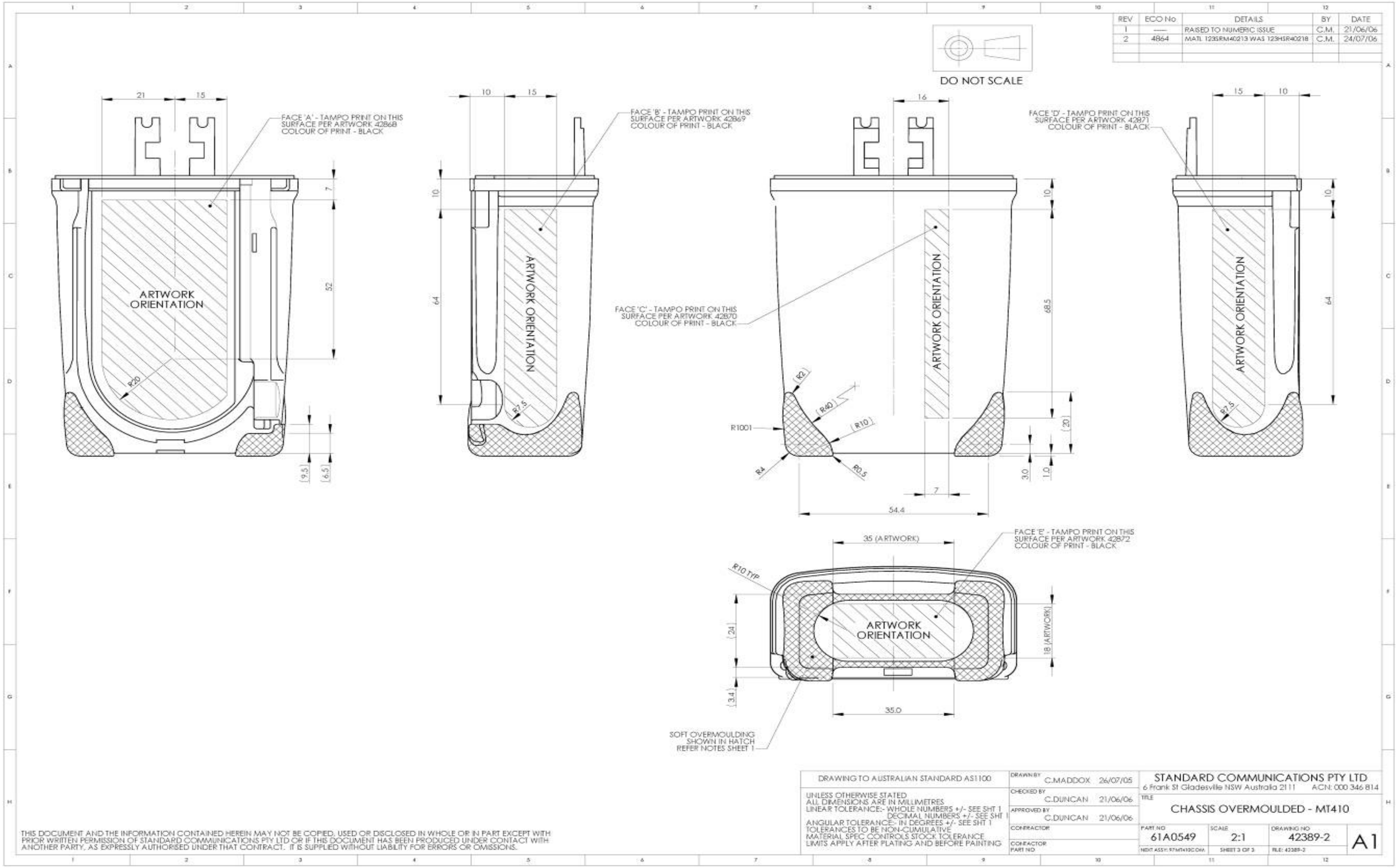
➢ **Keep batteries out of the reach of children**

Keep batteries which are considered swallowable out of the reach of children, especially those batteries fitting within the limits of the ingestion gauge as defined in figure 7.


REV | ECO No | DETAILS | BY | DATE
1 | — | RAISED TO NUMERIC ISSUE | C.M. | 21/06/06
2 | 4864 | MATL 123SRM40213 WAS 123HSR40218 | C.M. | 24/07/06
DO NOT SCALE
THIS AREA SHOWN HATCHED IS NOT TO HAVE THE FINE SPARK ERODED FINISH SEE NOTE 3
NOTES
1. CHASSIS OVERMOULDED P/N 61A0549 IS MADE IN 2 STAGES. CHASSIS P/N 61A0465 HARD MOULDING THEN OVERMOULDED BECOMING P/N 61A0549.
SHEETS 1 & 2 DETAILS THE P/N 61A0465 CHASSIS (HARD MOULDING) & SHEET 3 DETAILS P/N 61A0549 CHASSIS OVERMOULDED.
FOR TOOLING PURPOSES: CHASSIS 61A0465 REFER MODEL FILE: 61A0465-1.IGS AND CHASSIS OVERMOULDED 61A0549 REFER MODEL FILE: 61A0549-1.IGS
2. MATERIAL: HARD MOULDING - UV STABILISED POLYCARBONATE APPROVED MATERIAL: GE LEXAN 123SRM-40213
APPROXIMATE VOLUME = 42.8cc APPROXIMATE MASS = 51.4g
SOFT OVERMOULDING - THERMOPLASTIC ELASTOMER COMPOUND 65 SHORE A APPROVED MATERIAL: GLS CORP. VERSOLLAN OM 1262NX-9
APPROXIMATE VOLUME = 3.6cc APPROXIMATE MASS = 4.2g
3. FINISH: CHASSIS (HARD MOULDING) TO HAVE A FINE SPARK ERODED FINISH ON THE FIXED HALF AND SIDE CORE OF THE MOULD EXCEPT WHERE INDICATED.
TAMPO PRINT BLACK GRAPHICS PER ARTWORKS 42868, 42869, 42870, 42871 & 42872 AS INDICATED ON SHEET 3.
4. COLOUR: POLYCARBONATE - YELLOW PANTONE 012 ELASTOMER - BLACK
5. UNLESS OTHERWISE SPECIFIED:
- DRAFT TO BE 1° OR 0.5° PER MODEL FILE SUPPLIED.
- FILLETS SHOWN TO BE 1.0mm OR 0.5mm PER MODEL FILE SUPPLIED.
- CORNERS SHOWN AS SHARP MAY HAVE FILLET 0.2mm.
- GENERAL WALL THICKNESS (HARD MOULDING) TO BE 2.0mm.
6. PART TO BE FREE FROM FLASH, SURFACE DEFECTS AND IMPERFECTIONS.
DRAWING TO AUSTRALIAN STANDARD AS1100
UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- 0.3
DECIMAL NUMBERS +/- 0.1
ANGULAR TOLERANCE:- IN DEGREES +/- 0.5°
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING
DRAWN BY C.MADDOX 27/06/05
CHECKED BY C.DUNCAN 21/06/06
APPROVED BY C.DUNCAN 21/06/06
CONTRACTOR
CONTACTOR PART NO
STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814
TITLE
CHASSIS OVERMOULDED - MT410
PART NO 61A0549
SCALE 2:1
DRAWING NO 42389-2
A1
SHEET 1 OF 3
FILE: 42389-2
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN MAY NOT BE COPIED, USED OR DISCLOSED IN WHOLE OR IN PART EXCEPT WITH PRIOR WRITTEN PERMISSION OF STANDARD COMMUNICATIONS PTY LTD OR IF THIS DOCUMENT HAS BEEN PRODUCED UNDER CONTRACT WITH ANOTHER PARTY, AS EXPRESSLY AUTHORISED UNDER THAT CONTRACT. IT IS SUPPLIED WITHOUT LIABILITY FOR ERRORS OR OMISSIONS.

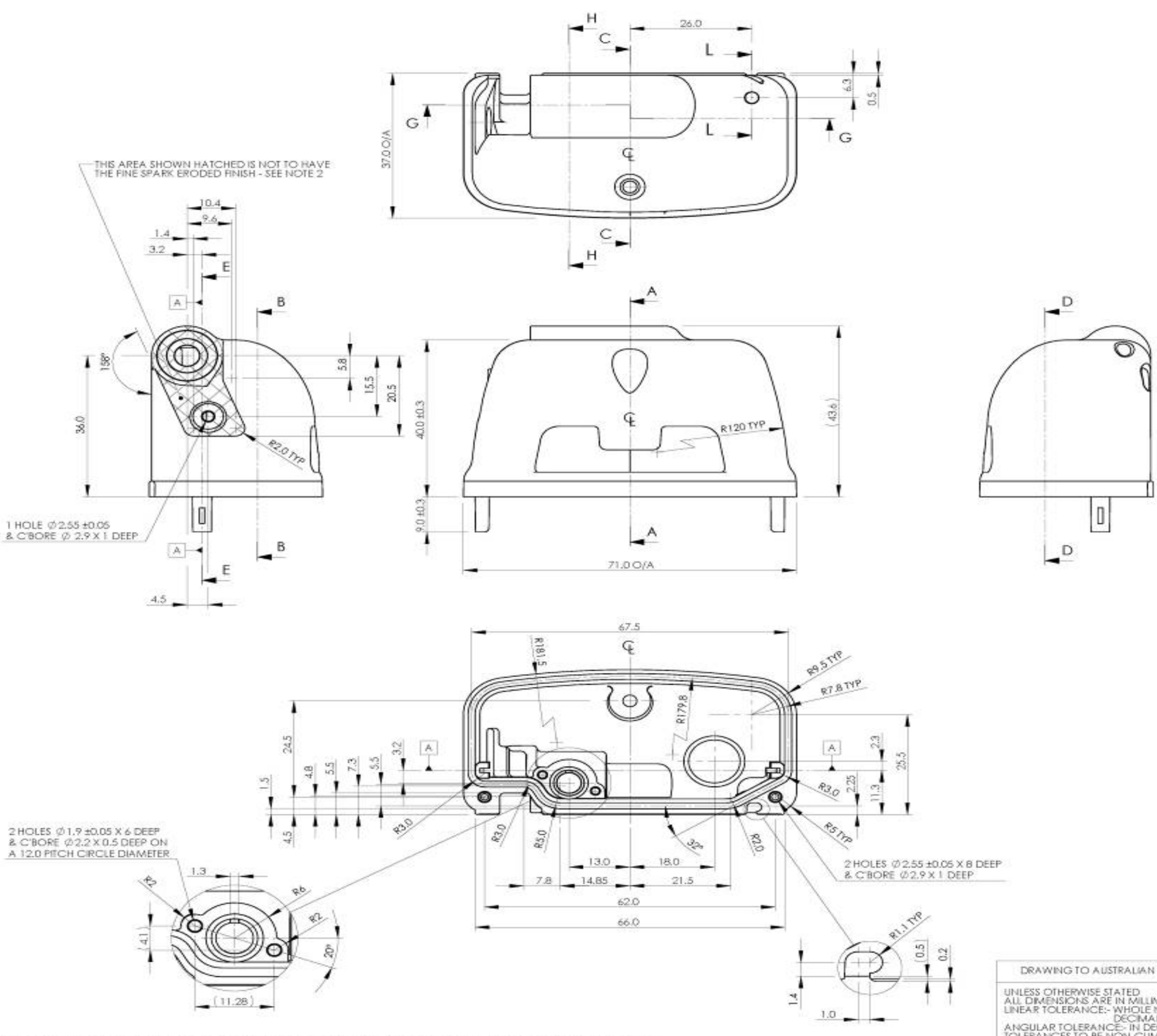


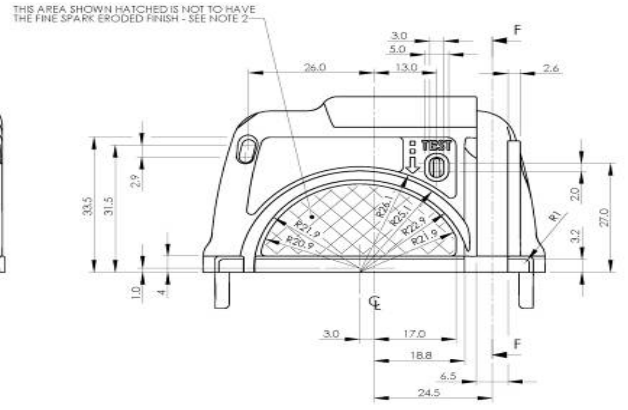
DO NOT SCALE
REV | ECO No | DETAILS | BY | DATE
1 | ---- | RAISED TO NUMERIC ISSUE | C.M. | 21/06/06
2 | 4864 | MATL 123SRM40213 WAS 123HSR40218 | C.M. | 24/07/06
34.3 AT DATUM Z
31.7 AT DATUM Z
68.8 AT DATUM Z
66.2 AT DATUM Z
DETAIL J (5 : 1)
DETAIL K (3 : 1)
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H
DRAWING TO AUSTRALIAN STANDARD AS1100
UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- SEE SHT 1
DECIMAL NUMBERS +/- SEE SHT 1
ANGULAR TOLERANCE:- IN DEGREES +/- SEE SHT 1
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING
DRAWN BY C.MADDOX 27/06/05
CHECKED BY C.DUNCAN 21/06/06
APPROVED BY C.DUNCAN 21/06/06
CONTRACTOR
CONTACTOR PART NO
STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814
TITLE
CHASSIS OVERMOULDED - MT410
PART NO 61A0549
SCALE 2:1
DRAWING NO 42389-2
A1
SHEET 2 OF 3
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN MAY NOT BE COPIED, USED OR DISCLOSED IN WHOLE OR IN PART EXCEPT WITH PRIOR WRITTEN PERMISSION OF STANDARD COMMUNICATIONS PTY LTD OR IF THIS DOCUMENT HAS BEEN PRODUCED UNDER CONTACT WITH ANOTHER PARTY, AS EXPRESSLY AUTHORISED UNDER THAT CONTRACT. IT IS SUPPLIED WITHOUT LIABILITY FOR ERRORS OR OMISSIONS.


REV | ECO No | DETAILS | BY | DATE
1 | — | RAISED TO NUMERIC ISSUE | C.M. | 21/06/06
2 | 4864 | MATL 123SRM40213 WAS 123HSR40218 | C.M. | 24/07/06
DO NOT SCALE
FACE 'A' - TAMPO PRINT ON THIS SURFACE PER ARTWORK 42868 COLOUR OF PRINT - BLACK
FACE 'B' - TAMPO PRINT ON THIS SURFACE PER ARTWORK 42869 COLOUR OF PRINT - BLACK
FACE 'C' - TAMPO PRINT ON THIS SURFACE PER ARTWORK 42870 COLOUR OF PRINT - BLACK
FACE 'D' - TAMPO PRINT ON THIS SURFACE PER ARTWORK 42871 COLOUR OF PRINT - BLACK
FACE 'E' - TAMPO PRINT ON THIS SURFACE PER ARTWORK 42872 COLOUR OF PRINT - BLACK
ARTWORK ORIENTATION
SOFT OVERMOULDING SHOWN IN HATCH REFER NOTES SHEET 1
35 (ARTWORK)
18 (ARTWORK)
R10 TYP
54.4
DRAWING TO AUSTRALIAN STANDARD AS1100
UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- SEE SHT 1
DECIMAL NUMBERS +/- SEE SHT 1
ANGULAR TOLERANCE:- IN DEGREES +/- SEE SHT 1
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING
DRAWN BY C.MADDOX 26/07/05
CHECKED BY C.DUNCAN 21/06/06
APPROVED BY C.DUNCAN 21/06/06
STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814
CHASSIS OVERMOULDED - MT410
PART NO 61A0549
SCALE 2:1
DRAWING NO 42389-2
A1
SHEET 3 OF 3
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN MAY NOT BE COPIED, USED OR DISCLOSED IN WHOLE OR IN PART EXCEPT WITH PRIOR WRITTEN PERMISSION OF STANDARD COMMUNICATIONS PTY LTD OR IF THIS DOCUMENT HAS BEEN PRODUCED UNDER CONTACT WITH ANOTHER PARTY, AS EXPRESSLY AUTHORISED UNDER THAT CONTRACT. IT IS SUPPLIED WITHOUT LIABILITY FOR ERRORS OR OMISSIONS.

REV	ECO No	DETAILS	BY	DATE
F	-----	DIMENSIONS & TOLERANCES ADDED	C.M.	08/12/05
G	-----	P/N 61A0663 & PRINTING ADDED	C.M.	13/06/06
1	-----	RAISED TO NUMERIC ISSUE	C.M.	15/08/06

DO NOT SCALE





PART No	DESCRIPTION	GRAPHICS FACE A	GRAPHICS FACE B	GRAPHICS FACE C	GRAPHICS FACE D
61A0466	COVER - MT410	43246	NONE	43248	43247
61A0663	COVER - MT410G	43249	43250	43248	43247

NOTES

1. MATERIAL: UV STABILISED POLYCARBONATE APPROXIMATE VOLUME = 22.1cc   APPROVED MATERIAL: GE LEXAN 143R-82031 APPROXIMATE MASS = 26.5g
2. FINISH: COVER TO HAVE A FINE SPARK ERODED FINISH ON THE FIXED HALF AND SIDE CORES OF THE MOULD EXCEPT WHERE INDICATED.
   TAMPO PRINT GRAPHICS PER ARTWORKS REFERENCED IN TABLE AND IN LOCATIONS AS INDICATED ON SHEET 3. INK TO BE THERMO-JET TYPE No 948 (BLACK).
3. COLOUR: OPAL (AS MOULDED)
4. UNLESS OTHERWISE SPECIFIED:
   - DRAFT TO BE 1° OR 0.5° PER MODEL FILE SUPPLIED.
   - FILLETS SHOWN TO BE 1.0mm OR 0.5mm PER MODEL FILE SUPPLIED.
   - CORNERS SHOWN AS SHARP MAY HAVE FILLET 0.2mm.
   - GENERAL WALL THICKNESS TO BE 2.0mm.
5. PART TO BE FREE FROM FLASH, SURFACE DEFECTS AND IMPERFECTIONS.
6. FOR TOOLING PURPOSES (MOULDING) REFER 3D MODEL FILE: 61A0466-1.X_T

DRAWING TO AUSTRALIAN STANDARD AS1100

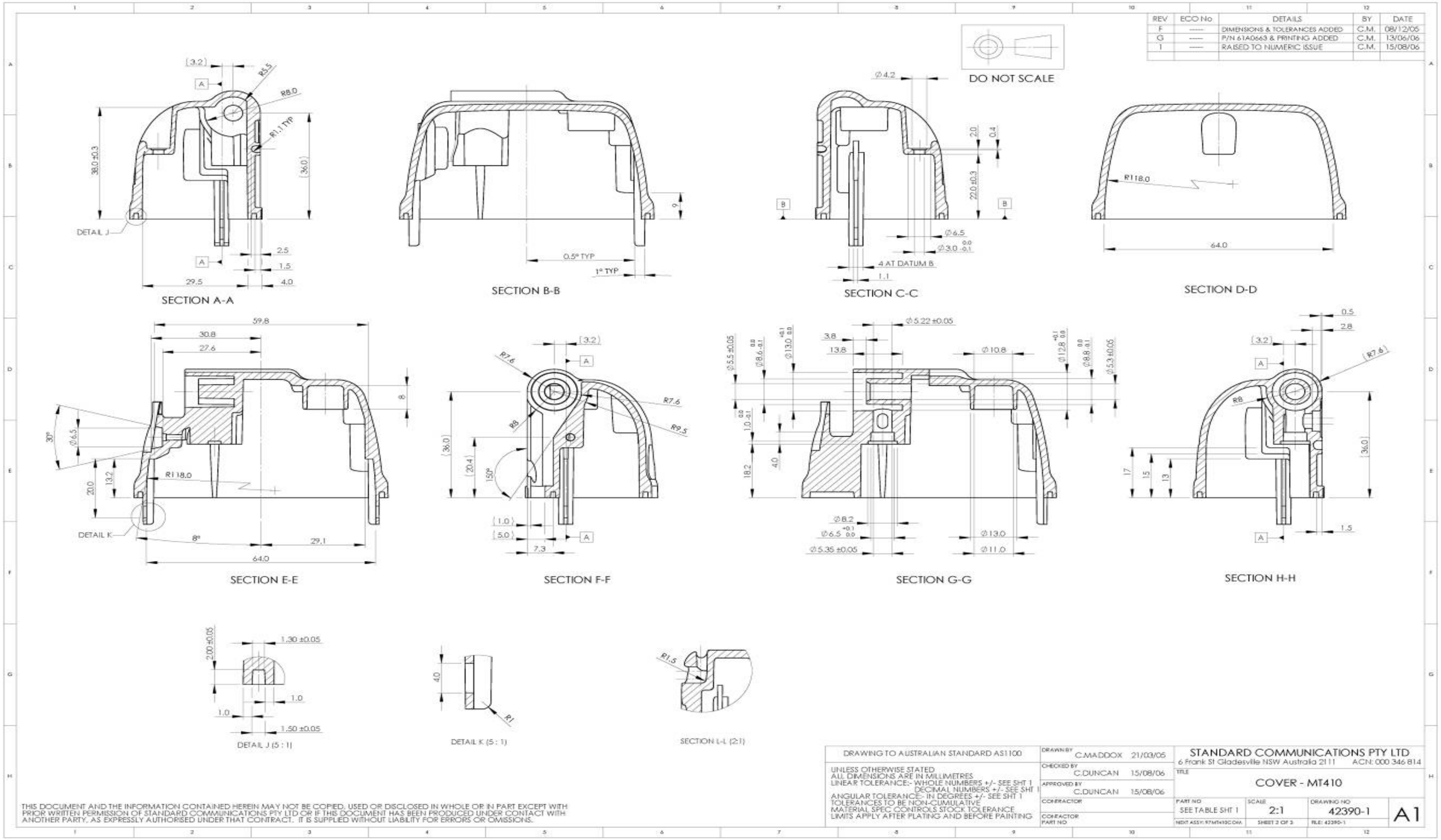
UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- 0.4
DECIMAL NUMBERS +/- 0.1
ANGULAR TOLERANCE:- IN DEGREES +/- 0.5°
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING

DRAWN BY C.MADDOX 21/03/05
CHECKED BY C.DUNCAN 15/08/06
APPROVED BY C.DUNCAN 15/08/06
CONTRACTOR
CONTACTOR PART NO

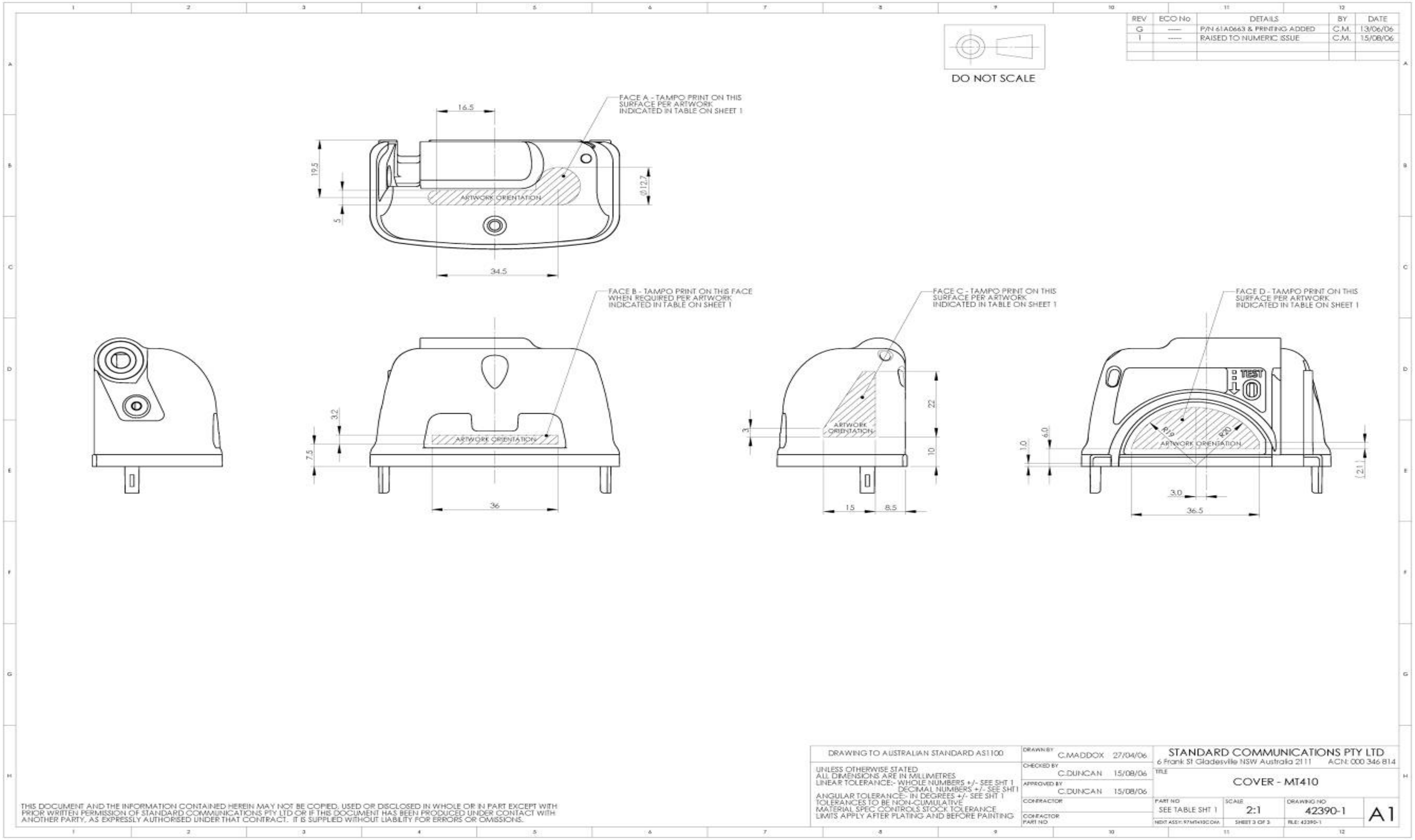
STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814

TITLE: COVER - MT410

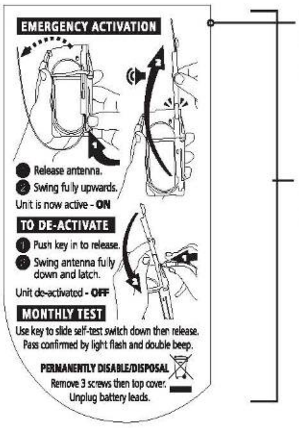
PART NO: SEE TABLE | SCALE: 2:1 | DRAWING NO: 42390-1 | A1
NEXT ASSY: 97MT410COM | SHEET 1 OF 3 | FILE: 42390-1



REV | ECO No | DETAILS | BY | DATE
F | — | DIMENSIONS & TOLERANCES ADDED | C.M. | 08/12/05
G | — | P/N 61A0663 & PRINTING ADDED | C.M. | 13/06/06
1 | — | RAISED TO NUMERIC ISSUE | C.M. | 15/08/06
DO NOT SCALE
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
SECTION F-F
SECTION G-G
SECTION H-H
DETAIL J (5 : 1)
DETAIL K (5 : 1)
SECTION L-L (2:1)
DRAWING TO AUSTRALIAN STANDARD AS1100
UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- SEE SHT 1
DECIMAL NUMBERS +/- SEE SHT 1
ANGULAR TOLERANCE:- IN DEGREES +/- SEE SHT 1
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING
DRAWN BY C.MADDOX 21/03/05
CHECKED BY C.DUNCAN 15/08/06
APPROVED BY C.DUNCAN 15/08/06
STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814
COVER - MT410
SEE TABLE SHT 1
2:1
42390-1
A1
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN MAY NOT BE COPIED, USED OR DISCLOSED IN WHOLE OR IN PART EXCEPT WITH PRIOR WRITTEN PERMISSION OF STANDARD COMMUNICATIONS PTY LTD OR IF THIS DOCUMENT HAS BEEN PRODUCED UNDER CONTACT WITH ANOTHER PARTY, AS EXPRESSLY AUTHORISED UNDER THAT CONTRACT. IT IS SUPPLIED WITHOUT LIABILITY FOR ERRORS OR OMISSIONS.


REV | ECO No | DETAILS | BY | DATE
G | ---- | P/N 61A0663 & PRINTING ADDED | C.M. | 13/06/06
1 | ---- | RAISED TO NUMERIC ISSUE | C.M. | 15/08/06
DO NOT SCALE
FACE A - TAMPO PRINT ON THIS SURFACE PER ARTWORK INDICATED IN TABLE ON SHEET 1
FACE B - TAMPO PRINT ON THIS FACE WHEN REQUIRED PER ARTWORK INDICATED IN TABLE ON SHEET 1
FACE C - TAMPO PRINT ON THIS SURFACE PER ARTWORK INDICATED IN TABLE ON SHEET 1
FACE D - TAMPO PRINT ON THIS SURFACE PER ARTWORK INDICATED IN TABLE ON SHEET 1
ARTWORK ORIENTATION
TEST
16.5
19.5
5
Ø12.7
34.5
3.2
7.5
36
3
22
10
15
8.5
6.0
1.0
R19
R20
3.0
36.5
(21)
THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN MAY NOT BE COPIED, USED OR DISCLOSED IN WHOLE OR IN PART EXCEPT WITH PRIOR WRITTEN PERMISSION OF STANDARD COMMUNICATIONS PTY LTD OR IF THIS DOCUMENT HAS BEEN PRODUCED UNDER CONTACT WITH ANOTHER PARTY, AS EXPRESSLY AUTHORISED UNDER THAT CONTRACT. IT IS SUPPLIED WITHOUT LIABILITY FOR ERRORS OR OMISSIONS.
DRAWING TO AUSTRALIAN STANDARD AS1100
UNLESS OTHERWISE STATED
ALL DIMENSIONS ARE IN MILLIMETRES
LINEAR TOLERANCE:- WHOLE NUMBERS +/- SEE SHT 1
DECIMAL NUMBERS +/- SEE SHT1
ANGULAR TOLERANCE:- IN DEGREES +/- SEE SHT 1
TOLERANCES TO BE NON-CUMULATIVE
MATERIAL SPEC CONTROLS STOCK TOLERANCE
LIMITS APPLY AFTER PLATING AND BEFORE PAINTING
DRAWN BY C.MADDOX 27/04/06
CHECKED BY C.DUNCAN 15/08/06
APPROVED BY C.DUNCAN 15/08/06
CONTRACTOR
CONTACTOR PART NO
STANDARD COMMUNICATIONS PTY LTD
6 Frank St Gladesville NSW Australia 2111 ACN: 000 346 814
TITLE
COVER - MT410
PART NO SEE TABLE SHT 1
SCALE 2:1
DRAWING NO 42390-1
A1
NEXT ASSY: 97MT410COM
SHEET 3 OF 3
FILE: 42390-1

MT410 - FACE A LABEL



STANDARD COMMUNICATIONS PTY LTD 6 frank Street Gladesville 2111 NSW Australia			
DRAWN MS	DESCRIPTION MT410 - FACE A LABEL		
	DO NOT SCALE PRINT		
DATE 9/05/05	PART NO. 61A0549	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 42868	ISS. 2
DISK FILE: GD Dept Archive	FILENAME: 42868-2 MT410 face A label		

STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

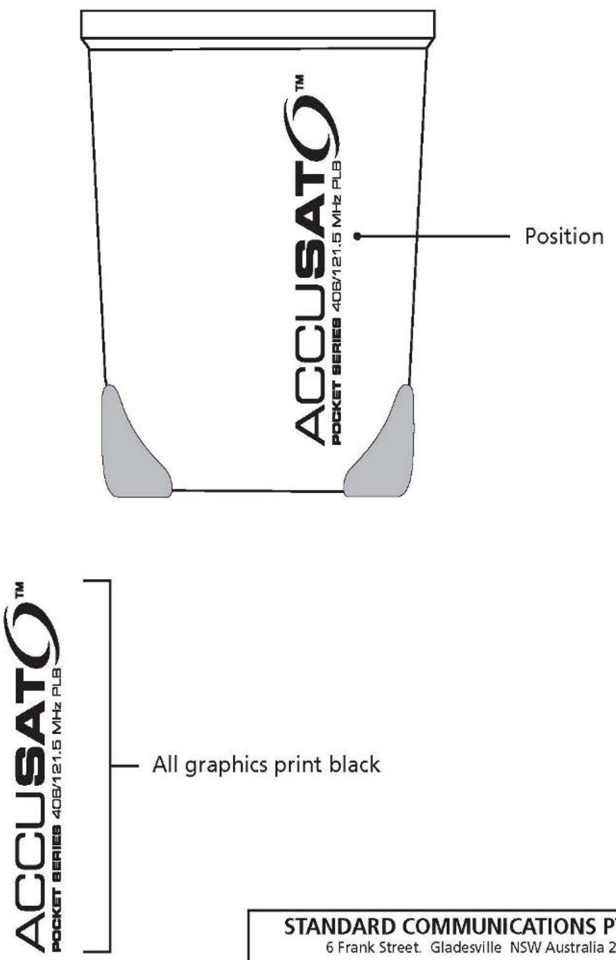
DRAWN MC	DESCRIPTION MT410 Face B Label		
	DO NOT SCALE PRINT		
DATE 130406	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 42869	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 42869-1_MT410FaceB	

MT410 SERIES PLB 406 +121 MHz

STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

DRAWN MC	DESCRIPTION MT410 Front C Label		
	DO NOT SCALE PRINT		
DATE 130406	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 42870	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 42870-1_MT410FrontC	

MT410 Front C Label



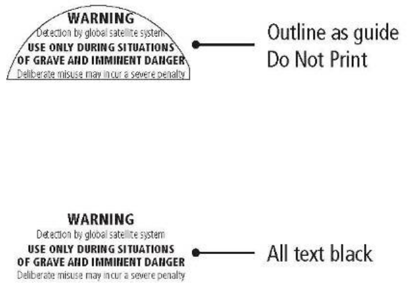
STANDARD COMMUNICATIONS PTY LTD 6 Frank Street. Gladesville NSW Australia 2111			
DRAWN MS	DESCRIPTION MT410 Front C Label		
	DO NOT SCALE PRINT		
DATE 27/11/06	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 42870	ISS. 2
DISK FILE: Art Department Archive	FILENAME: 42870-2_MT410FrontC		

Owner must register PLB with National Authority.

Made in Australia by: **GME**

Standard Communications PTY LTD
Locked Bag 2086, North Ryde, NSW 1670
www.gme.net.au

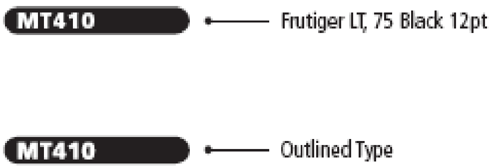
STANDARD COMMUNICATIONS PTY LTD 6 Frank Street. Gladesville NSW Australia 2111			
DRAWN MC	DESCRIPTION MT410 Face E Label		
	DO NOT SCALE PRINT		
DATE 130406	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 42872	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 42872-1_MT410FaceE	



STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

DRAWN MC	DESCRIPTION MT410 Face D Artwork Cover		
	DO NOT SCALE PRINT		
DATE 140606	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 43247	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 43247-1_MT410 FaceD	

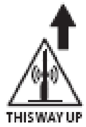
STANDARD COMMUNICATIONS PTY LTD 6 Frank Street. Gladesville NSW Australia 2111			
DRAWN MC/MS	DESCRIPTION MT410 Face D Label		
	DO NOT SCALE PRINT		
DATE 5/06/06	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 42871	ISS. 2
DISK FILE: Art Department Archive		FILENAME: 42871-2_MT410FaceD	



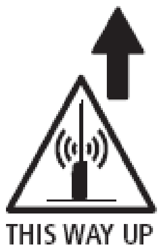
STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

DRAWN MC	DESCRIPTION MT410 Face A Artwork- Cover		
	DO NOT SCALE PRINT		
DATE 080606	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 43246	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 43246-1_MT410FaceA	

Artwork 1:1

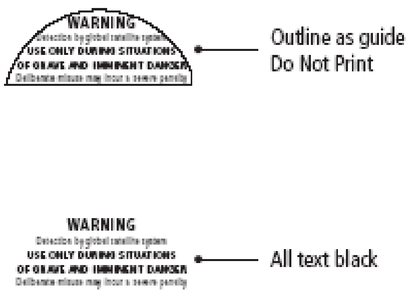


Artwork 2:1



STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

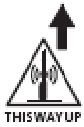
DRAWN MC	DESCRIPTION MT410 Face C Artwork- Cover		
	DO NOT SCALE PRINT		
DATE 70606	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 43248	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 43248-1_MT410FaceC	



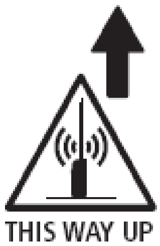
STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

DRAWN MC	DESCRIPTION MT410 Face D Artwork Cover		
	DO NOT SCALE PRINT		
DATE 140606	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 43247	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 43247-1_MT410 FaceD	

Artwork 1:1

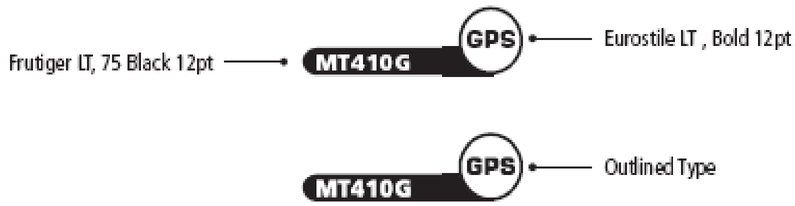


Artwork 2:1



STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

DRAWN MC	DESCRIPTION MT410 Face C Artwork- Cover		
	DO NOT SCALE PRINT		
DATE 70606	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 43248	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 43248-1_MT410FaceC	



STANDARD COMMUNICATIONS PTY LTD 6 Frank Street. Gladesville NSW Australia 2111				
DRAWN MC	DESCRIPTION MT410G Face A Artwork- Cover			
	DO NOT SCALE PRINT			
DATE 080606	PART NO.	UNITS	SHEET OF 1:1	
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1	
	DEVELOPMENT NO.	DRAWING NO. 43249	ISS. 1	
DISK FILE: Art Department Archive		FILENAME: 43249-1_MT410GFaceA		

GPS EQUIPPED — Eurostile LT, Bold

GPS EQUIPPED — Outlined Type

STANDARD COMMUNICATIONS PTY LTD
6 Frank Street. Gladesville NSW Australia 2111

DRAWN MC	DESCRIPTION MT410G Face B Artwork- Cover		
	DO NOT SCALE PRINT		
DATE 70606	PART NO.	UNITS	SHEET OF 1:1
APP	SUPP DRG. NO.	SIZE A4	SCALE 1:1
	DEVELOPMENT NO.	DRAWING NO. 43250	ISS. 1
DISK FILE: Art Department Archive		FILENAME: 43250-1_MT410GFaceB	

PLB Model(s): MT410/MT410G
TYPE APPROVAL SUBMISSION PREPARED FOR COSPAS/SARSAT

Approved: Craig DUNCAN
Position: Project Engineering Manager
Date: 4th December, 2006
Endorsement:

MCXO IMPLEMENTATION

1. INTRODUCTION

A proprietary digitally corrected frequency generator is used within the MT410 and MT410G model PLB to provide a frequency output which is largely immune to the effects of temperature change and applied thermal shock. This implementation provides significant performance margin in respect to both the previous, and current relaxed, COSPAS-SARSAT Class 2 specification requirements.

The design and implementation is identical to that used within the currently approved beacon models MT400, MT401 and MT401FF.

2. IMPLEMENTATION

The process of temperature compensation is distributed through and integrated within the design of both PLB models. It cannot be isolated as a separate component or subassembly. By way of example the Direct Digital Synthesis (DDS) function) which is used to provide fine frequency adjustments is also the data modulator for the transmitted digital message; the microcontroller performs precision digitisation of the temperature sensor voltage and voltage reference circuits also provides general functional control of all beacon functions.

For the purpose of calibration each completed circuit assembly is temperature cycled (both up and down directions). Further, the process of cycling and high temperature burn-in exposes potential faults, if present, that may otherwise had lead to premature failure of a an individual beacon.

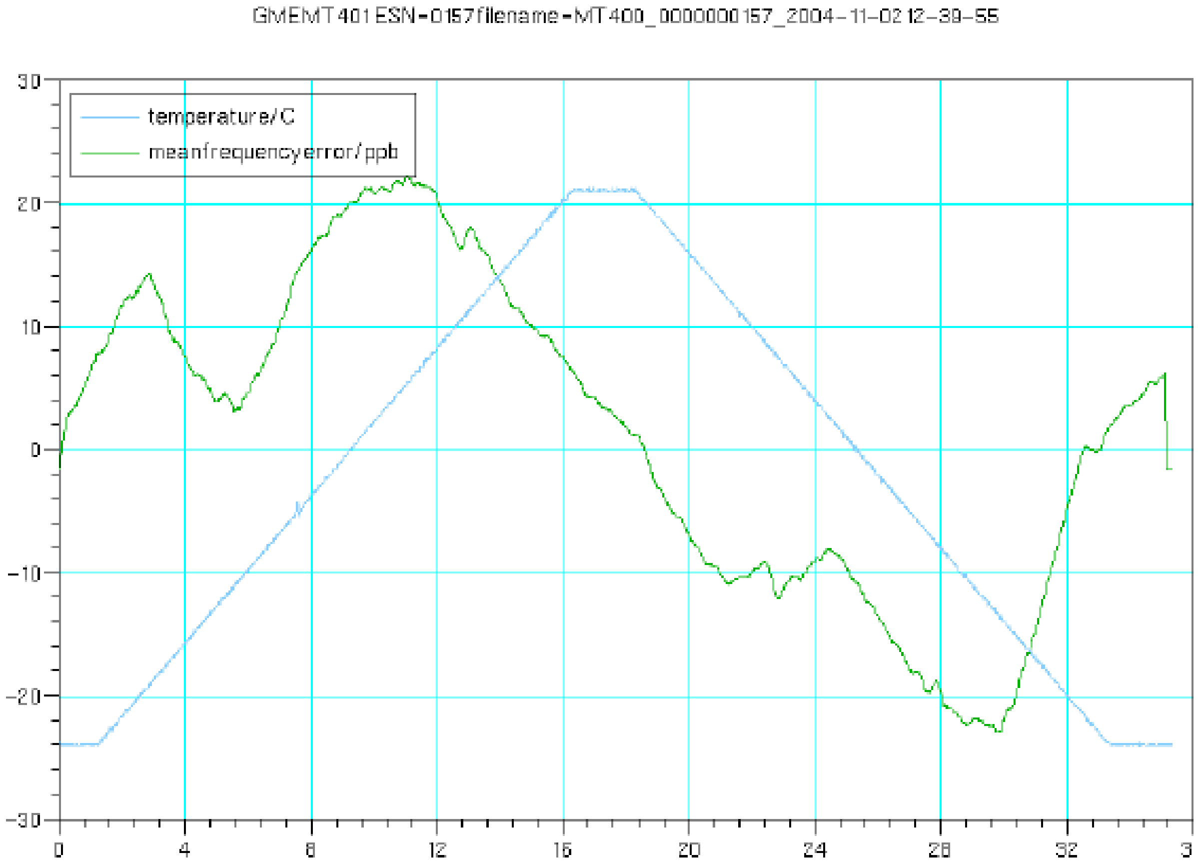
3. PERFORMANCE

Annex A shows typically achieved levels of performance, this time from a MT401. Please also refer to the TUV Test report for data collected during testing of the MT410/G.

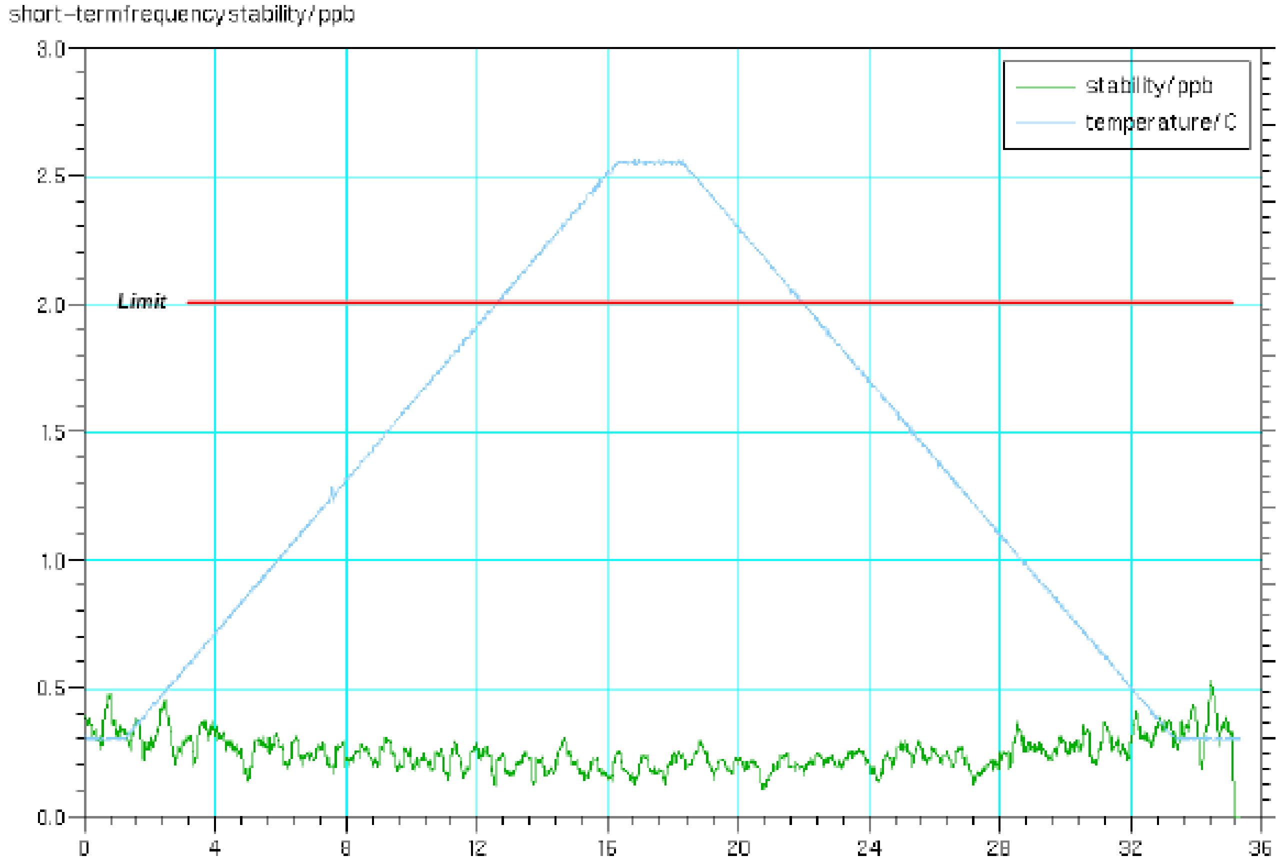
⇨

MT401

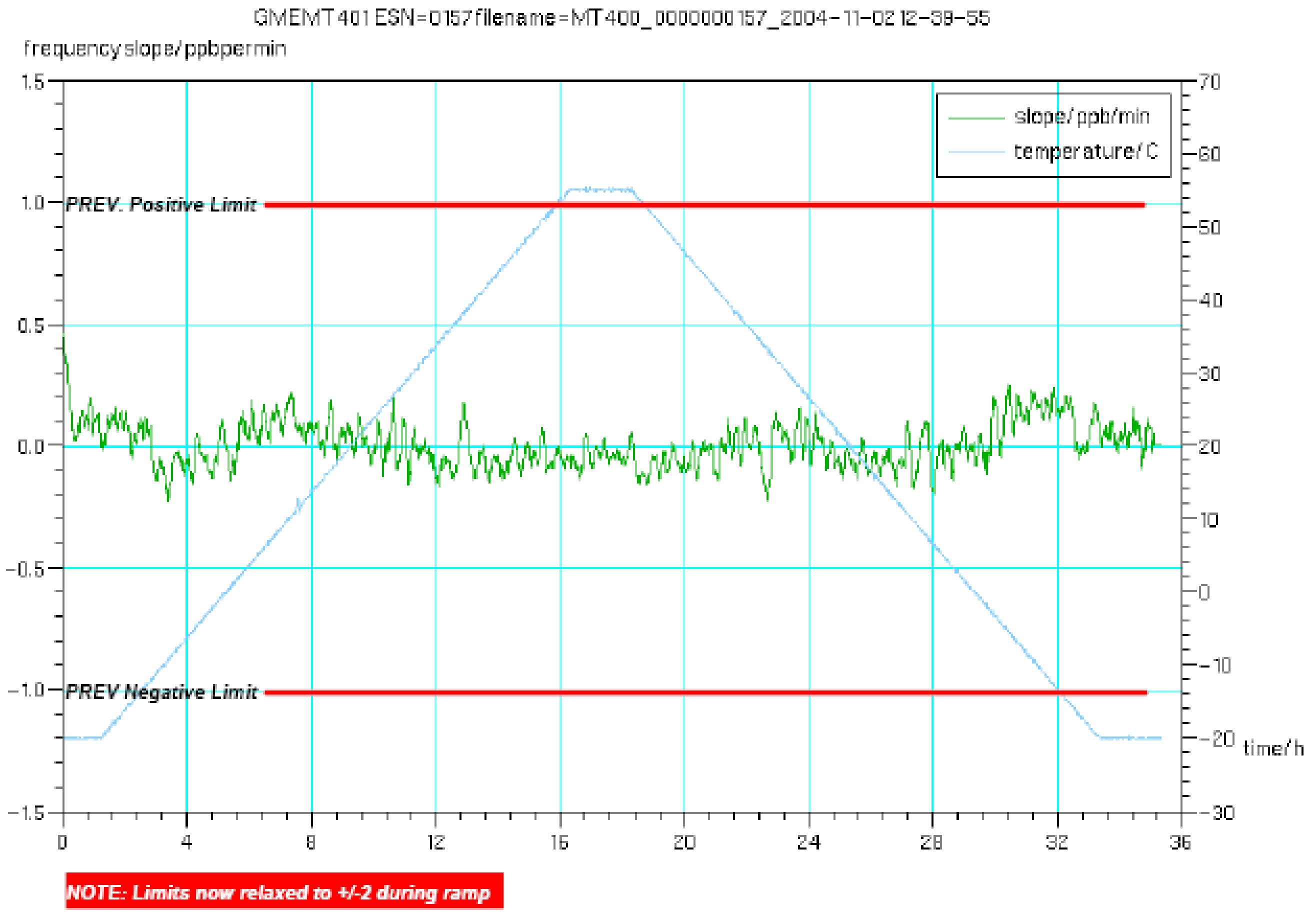
Temperature Gradient Test - Commenced 2004-11-02 on S/N 157



GMEMT401 ESN=0157 filename=MT400_0000000157_2004-11-02 12-38-55



Plot 2C



GMEMT401 ESN=0157 filename=MT400_0000000157_2004-11-02 12-39-55
frequency slope/ppbpermin
slope/ppb/min
temperature/C
PREV. Positive Limit
PREV Negative Limit
time/h
NOTE: Limits now relaxed to +/-2 during ramp

PLB Model(s): MT410/MT410G

TYPE APPROVAL SUBMISSION
PREPARED FOR COSPAS/SARSAT

Prepared: Craig DUNCAN
Position: Project Engineering Manager
Date: 3rd December, 2006
Endorsement:

PROTECTION AGAINST CONTINUOUS TRANSMISSION

1. INTRODUCTION

The MT410/410G architecture and circuitry contains integral security features designed to eliminate the occurrence of an extended on channel emission.

These features are identical in design and implementation to those employed within the approved MT400, MT401 and MT401FF EPIRB (TAC 139).

2. PROTECTION FEATURES

The following features all act to ensure than an extended transmission event will not occur:

2.1 Microcontroller Watchdog Timer

This feature protects against a software execution failure which may have been either hardware or software induced.

A hardware based counter is provided which is clocked off the microcontroller's oscillator. The counters value must be reset by software intervention every 3 seconds; else associated circuitry will force a hard reset. The reset of the controller's circuitry and software is designed to clear the fault condition by resetting all registers and variables to their initial start-up values.

2.2 Low Voltage Detect and Reset

This feature protects against an execution failure which by induced by a failing battery supply.

Operating currents widely fluctuate during the normal PLB operating cycle as some functions, such as 406MHz transmission and strobe operation, are energy intensive. A reduced operating voltage or 'glitch' can affect proper software operation. For this reason the supply voltage is monitored. If it crosses an alarm threshold high current functions are immediately aborted so that the operating voltage is restored. A lower second alarm threshold is provided which signals that a critically low supply condition is being approached. Note, the alarm thresholds are monitored to avoid the occurrence of attempted, then aborted, 406MHz transmissions at end of battery life.

2.3 Circuit Enable Functions

This feature protects against the failure of the 406MHz circuitry to turn off when instructed to do so by the executable software.

Each major functional element, namely the reference oscillator, 406MHz generator and RF power amplifier, are enabled and disabled by their own independent control signal. All three functions must be simultaneously active for a 406MHz emission to occur. Normally between transmissions these functions are disabled.

⇨ 2.4 System Lock-up

This feature protects against a stalled microprocessor clock during a 406MHz transmission.

If the microprocessor clock fails then no software will execute and the watchdog timer will be ineffective. All microprocessor outputs would remain static.

The 406 Mhz generator enable input is edge triggered. That is, a level transition will enable that circuit for approximately 1.5s duration, after which that function will automatically de-activate.

3. CONCLUSION

Current COSPAS-SARSAT specifications require that (C/S T.001, para 2.3.8):

> *'The distress beacon shall be designed to limit any inadvertent continuous transmission to a maximum of 45 seconds.'*

The MT410/410G design provides robust protection against the occurrence of an extended transmission ever exceeding approximately 1.5 seconds duration.

Fault Mode Analysis (FMA) has identified that 2 or more independent failures within a single PLB unit would be required for these features to be overcome.

PLB Model(s): MT410/MT410G

TYPE APPROVAL SUBMISSION PREPARED FOR COSPAS/SARSAT

Approved: Craig DUNCAN
Position: Project Engineering Manager
Date: 4th December, 2006
Endorsement:

FREQUENCY STABILITY REQUIREMENTS

The design and implementation of the frequency generator circuitry used within the MT410/410G is identical in design and implementation to that employed within the C-S approved MT400, MT401 and MT401FF EPIRB (TAC139).

⇨ Standard Communications has previously provided information as part of the formal TA process supporting the long term performance of its first digitally frequency compensated model the MT400. Further, this submission was supplemented by additional underlying information provided over the preceding two years, as part of its effort in establishing to the Secretariat the acceptability of a non-ovenised oscillator based low cost beacon.

This information on file at the C-S Secretariat is equally applicable in support of the MT410 and MT410 TA applications.

PLB Model(s): MT410/MT410G

TYPE APPROVAL SUBMISSION PREPARED FOR COSPAS/SARSAT

Approved: Craig DUNCAN
Position: Project Engineering Manager
Date: 1st December, 2006
Endorsement:

PROTECTION FROM REPETITIVE SELF-TEST

1. INTRODUCTION

⇨ The potential for repetitive self-test emissions arises during a hardware or software malfunction involving the beacons controller circuitry.

It is more likely that such malfunctions could occur towards the end of battery life, where the supply voltage is insufficient to support reliable microprocessor operation.

The features used within the MT410/410G are identical in design and implementation to those employed within the approved MT400, MT401 and MT401FF EPIRB (TAC139).

2. PROTECTION FEATURES

The MT410/410G architecture and circuitry contains integral measures designed to avoid the potential occurrence of repetitive self-test emissions. Primarily these measures are aimed at ensuring that the MT410/410G software always executes as intended; from initial activation right through to the point where all power reserves are exhausted.

A pictorial presentation of the state machine as it relates to this topic is given at ANNEX A.

2.1 Microcontroller Watchdog Timer Reset

This feature protects against a software execution failure which may have been either hardware or software induced.

A hardware based counter is provided which is clocked off the microcontroller's oscillator. The counters value must be reset by software intervention every 3 seconds; else associated circuitry will force a hard reset. The reset of the controller's circuitry and software is designed to clear the fault condition by resetting all registers and variables to their initial start-up values.

A restart of this type does not commence with the usual unit power up self-test. Normal emissions will not be enabled until one full 406MHz transmission interval has elapsed. A fault which cannot be cleared by a hard reset and results in a continuous stream of watchdog time-outs will therefore not result in any unit emissions.

2.2 Protection of Microcontroller Operating Voltage

This feature will not allow the microcontroller to place the beacon in an operational state which will compromise its own supply voltage requirements.

During a 406MHz transmission and strobe light flashes particularly high energy demands are placed on the battery cells. The terminal voltage on a significantly depleted cell will dip whilst a high current demand is present, and subsequently recover once that demand is removed.

⇨ Voltage detection circuitry provided within the beacon continuously monitors the supply voltage provided to the microcontroller. If that voltage passes down through a predefined threshold a microcontroller interrupt is generated. The interrupt service routine within the firmware immediately aborts the current 406MHz/strobe flash prior to the voltage reaching a critically low level.

In the instance of an operator initiated self-test (which normally includes a 406MHz transmission and operation of the strobe), correct microcontroller operation is ensured by this protective feature even when the battery energy reserve is nearly exhausted. Note that the unit will report a self-test failure should a low voltage level be detected.

2.3 End of Life Operational mode

This feature provides for an extended operational duration of the beacon and a graceful failure as battery capacity is exhausted. By controlling the end-of-life performance the occurrence of spurious self-test (and other) messages are avoided.

During a 406 MHz transmission, or strobe flash, a high current demand of short duration is placed on the battery cells. In contrast 121.5 MHz homer operation places a much more modest, but continuous requirement on the energy source. Consequently as cells discharge they will reach a point where they are unable to service high current demands (terminal voltage collapses significantly), but could continue to support satisfactory operation of the homer transmitter.

The MT410/410G includes a feature which monitors whether the battery can support correct operation of the 406MHz transmission and strobe flash (see 2.2 above). Should the number of aborted failures exceed a preset limit (currently set to 4) then:

- it is deemed that the battery cell capacity is almost exhausted
- no further 406MHz transmissions (or strobe flashes) shall be attempted
- the units audible enunciator will continue to operate to indicate that the unit is activated
- 121.5 MHz homer operation shall continue until all available energy is consumed, at which time the unit will completely cease to operate.

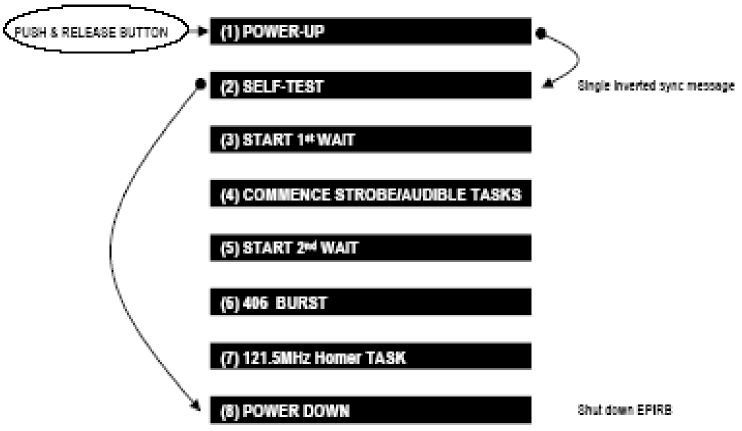
Note that if the MT410/410G is switched off, then on again, the limit counter will be reset and the unit will attempt to enter the normal operational mode.

An important consequence of this feature, other than minimising wasted energy in aborted 406MHz transmissions (or strobe flashes), is that it eliminates corrupted part transmissions to the satellite that might otherwise occur over an extended period of time.

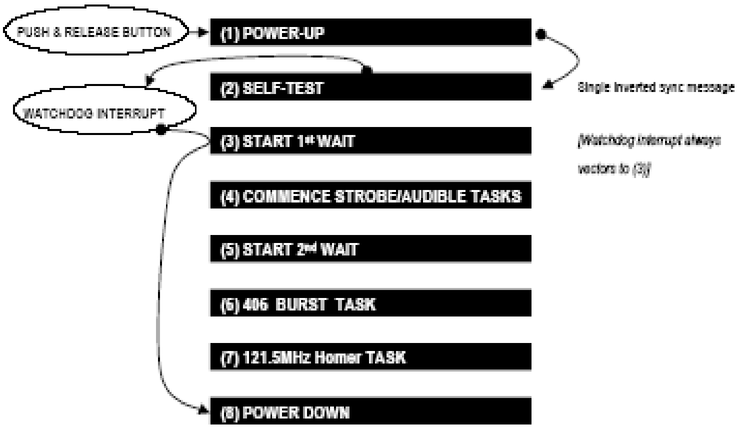
3. CONCLUSION

The MT410/410G design incorporates a number of features which will act to prevent the occurrence of repetitive self-test transmissions.

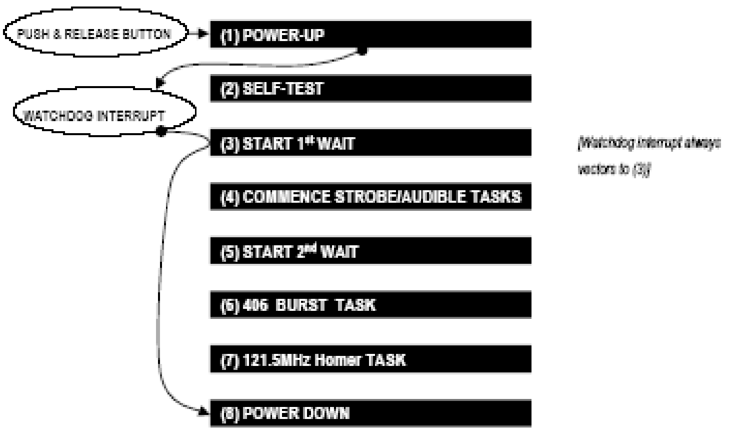
MODE: Operator initiated Self-Test Activation - NORMAL



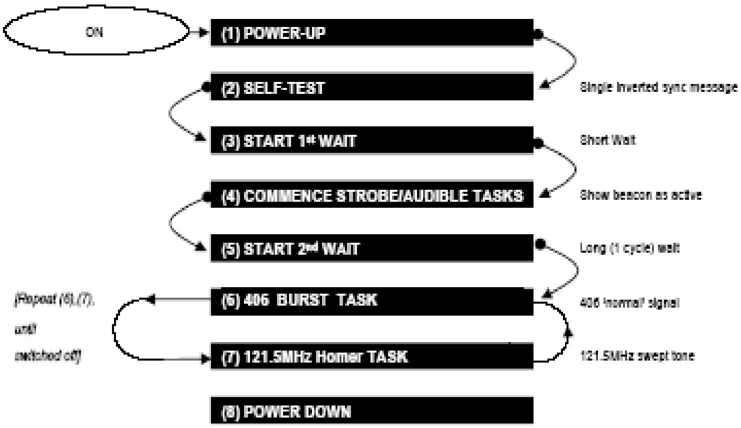
MODE: Operator initiated Self-Test Activation – EXECUTION FAILURE RECOVERY #1



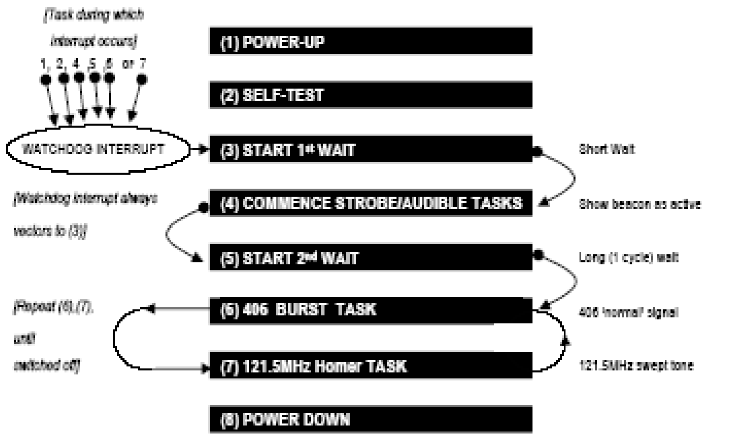
MODE: Operator initiated Self-Test Activation – EXECUTION FAILURE RECOVERY #2



MODE: Operator initiated Activation - NORMAL



MODE: Operator initiated Activation – EXECUTION FAILURE RECOVERY



PLB Model(s): MT410/MT410G

TYPE APPROVAL SUBMISSION
PREPARED FOR COSPAS/SARSAT

Prepared: Kevan Wilson-Elswood
Position: Senior Design Engineer (RF)

Approved: Craig DUNCAN
Position: Project Engineering Manager
Date: 1st December, 2006
Endorsement:

50 OHM INTERFACE ADAPTOR

1. INTRODUCTION

The MT410 is equipped with a permanently attached (integral) antenna. To obtain optimum power efficiency the 121.5MHz and 406MHz amplifier circuits are directly matched to the respective antenna impedance at those frequencies.

In order to support laboratory measurements it is convenient to have an adaptor which simulates the antenna and provides a 50 ohm interface port to which test equipment may be directly connected.

2. TECHNICAL DESCRIPTION

2.1 Antenna Measurements

With the MT410 in a standard deployment, the antenna has been measured as presenting the following impedances at the interface with the internal circuitry:

$Z_{121} = 51 - j333$

$Z_{406} = 74 - j258$

2.2 Circuit Configuration

The Circuit of Figure 1 was designed and optimised so as to present the above impedances when it is used to replace the MT410 antenna.

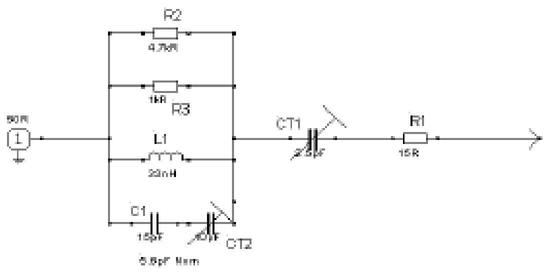


Figure 1 – 50 ohm Interface Adaptor

Circuit Description

C1, CT2 and L1 are Parallel resonant at a frequency just less than 406MHz. This combination presents a low inductive reactance at 121MHz and a large capacitive reactance at 406MHz . CT1 is adjusted such that this inductive reactance, when combined with the capacitive reactance of CT1 and resistance R1, provides the correct impedance at 121.5MHz.

CT2 is then adjusted such that the parallel circuit (which is capacitive at 406MHz) adds to the negative reactance of CT1. Due to the small value of L1, adjustment of CT2 has minimal effect at 121.5MHz.

Resistors R1, R2 and R3 were empirically determined to compensate for parasitics within the circuit, ensuring that the correct real value of impedance was presented to the Unit at both frequencies

A theoretical design was used as a starting point. Component values were adjusted on the physical unit, based on impedance measurements made using a Vector Network Analyser (this is why the nominal circuit values may not appear to be optimal in a theoretical analysis).

2.3 Loss Calibration

The unit was calibrated to determine circuit, cable and connector loss:

Loss = 1.35dB @ 121MHz
Loss = 6.4dB @ 406MHz

NOTE: *The above figures apply to the unit supplied for testing. Other similarly constructed units may have slightly different loss figures due to component tolerances. Loss figures to be verified/determined on an individual unit basis*

BEACON QUALITY ASSURANCE PLAN

We, manufacturer of Cospas-Sarsat 406 MHz beacons (Manufacturer name and address)

STANDARD COMMUNICATIONS PTY LTD

6 Frank St. Gladesville, NSW Australia

confirm that ALL PRODUCTION UNITS of the following beacon model(s),

MT410

(model, part number)

will meet the Cospas-Sarsat specification and technical requirements in a similar manner to the units subjected for type approval testing. To this effect all production units will be subjected to following tests at ambient temperature:

- Digital message
- Bit rate
- Rise and fall times of the modulation waveform
- Modulation Index (positive/negative)
- Output power
- Frequency stability (short, medium)*

Note*: Beacon manufacturer shall provide technical data on the beacon frequency generation to demonstrate that the frequency stability tests at ambient temperature are sufficient for ensuring that each production beacon will exhibit frequency stability performance similar to the beacon submitted for type approval over the complete operating temperature range. If such assurance of adequate performance over the complete operating temperature range cannot be deduced from the technical data provided and the frequency stability test results at ambient temperature, a thermal gradient test shall be performed on all production units.

- Other tests:

Full circuit level performance test of card assembly using Bed-of-Nails to assess voltage, current, frequency etc, as relevant, to all critical test nodes.

Alignment and verification using a complete thermal gradient cycle with maximum and minimum temperature extremes which are in excess of those specified for Class 2 operation.

We confirm that the above tests will be performed as appropriate to ensure that the complete beacon satisfies Cospas-Sarsat requirements, as demonstrated by the test unit submitted for type approval.

We agree to keep the test result sheet of every production beacon for inspection by Cospas-Sarsat, if required, for a minimum of 10 years.

We confirm that Cospas-Sarsat representative(s) have the right to visit our premises to witness the production and testing process of the above-mentioned beacons. We understand that the cost related to the visit is to be borne by Cospas-Sarsat.

We also accept that, upon official notification of Cospas-Sarsat, we may be required to re-submit a unit of the above beacon model selected by Cospas-Sarsat for the testing of parameters chosen at Cospas-Sarsat discretion at a Cospas-Sarsat accepted test facility selected by the Cospas-Sarsat. We understand that the cost of the testing shall be borne by Cospas-Sarsat.

We understand that the Cospas-Sarsat Type Approval Certificate is subject to revocation should the beacon type for which it was issued, or its modifications, cease to meet the Cospas-Sarsat specifications, or Cospas-Sarsat has determined that this quality assurance plan is not implemented in a satisfactory manner.

Dated: *5th October, 2006* Signed: *CRAIG DUNCAN, Project Engineering Manager*

(Name, Position and Signature of Beacon Manufacturer Representative)

BEACON QUALITY ASSURANCE PLAN

We, manufacturer of Cospas-Sarsat 406 MHz beacons (Manufacturer name and address)

STANDARD COMMUNICATIONS PTY LTD

6 Frank St. Gladesville, NSW Australia

confirm that ALL PRODUCTION UNITS of the following beacon model(s),

MT410G

(model, part number)

will meet the Cospas-Sarsat specification and technical requirements in a similar manner to the units subjected for type approval testing. To this effect all production units will be subjected to following tests at ambient temperature:

- Digital message
- Bit rate
- Rise and fall times of the modulation waveform
- Modulation Index (positive/negative)
- Output power
- Frequency stability (short, medium)*

Note*: Beacon manufacturer shall provide technical data on the beacon frequency generation to demonstrate that the frequency stability tests at ambient temperature are sufficient for ensuring that each production beacon will exhibit frequency stability performance similar to the beacon submitted for type approval over the complete operating temperature range. If such assurance of adequate performance over the complete operating temperature range cannot be deduced from the technical data provided and the frequency stability test results at ambient temperature, a thermal gradient test shall be performed on all production units.

- Other tests:

Full circuit level performance test of card assembly using Bed-of-Nails to assess voltage, current, frequency etc, as relevant, to all critical test nodes.

Alignment and verification using a complete thermal gradient cycle with maximum and minimum temperature extremes which are in excess of those specified for Class 2 operation.

GPS receiver signal acquisition using satellite simulator.

We confirm that the above tests will be performed as appropriate to ensure that the complete beacon satisfies Cospas-Sarsat requirements, as demonstrated by the test unit submitted for type approval.

We agree to keep the test result sheet of every production beacon for inspection by Cospas-Sarsat, if required, for a minimum of 10 years.

We confirm that Cospas-Sarsat representative(s) have the right to visit our premises to witness the production and testing process of the above-mentioned beacons. We understand that the cost related to the visit is to be borne by Cospas-Sarsat.

We also accept that, upon official notification of Cospas-Sarsat, we may be required to re-submit a unit of the above beacon model selected by Cospas-Sarsat for the testing of parameters chosen at Cospas-Sarsat discretion at a Cospas-Sarsat accepted test facility selected by the Cospas-Sarsat. We understand that the cost of the testing shall be borne by Cospas-Sarsat.

We understand that the Cospas-Sarsat Type Approval Certificate is subject to revocation should the beacon type for which it was issued, or its modifications, cease to meet the Cospas-Sarsat specifications, or Cospas-Sarsat has determined that this quality assurance plan is not implemented in a satisfactory manner.

Dated: *5th October, 2006* Signed: *CRAIG DUNCAN, Project Engineering Manager*

(Name, Position and Signature of Beacon Manufacturer Representative)

PLB Model(s): MT410/MT410G
TYPE APPROVAL SUBMISSION
PREPARED FOR COSPAS/SARSAT

Approved: Craig DUNCAN
Position: Project Engineering Manager
Date: 14th December, 2006
Endorsement:

⇨

50 OHM INTERFACE

1. INTRODUCTION

In order to support laboratory measurements it is convenient to have an adaptor which simulates the antenna and provides a 50 ohm interface port to which test equipment may be directly connected.

The design of the impedance adaptor is detailed in submission document ED061201-04. This document provides clarification as to the method of interface.

2. DESCRIPTION

The wire radiating element is removed from the MT410/G and the adaptor circuit connected directly at that point and also to module ground. For the purposes of clarity the method of adaptation is shown diagrammatically as **BEFORE** (**Figure 1**) and **AFTER** (**Figure 2**).

This approach has been adopted as it includes all beacon passive and active components, with only the wire radiating element ('the antenna') removed.

The adaptor circuitry (detailed elsewhere) has been designed such that when a 50 ohm load is present at the connector (ie the test equipment) both 406MHz and 121.5MHz RF amplifiers see the same impedance as if the antenna element was present.

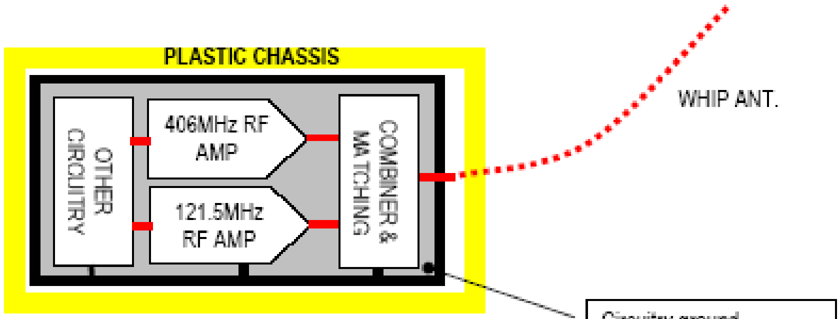


Figure 1 Normal Configuration

⇨

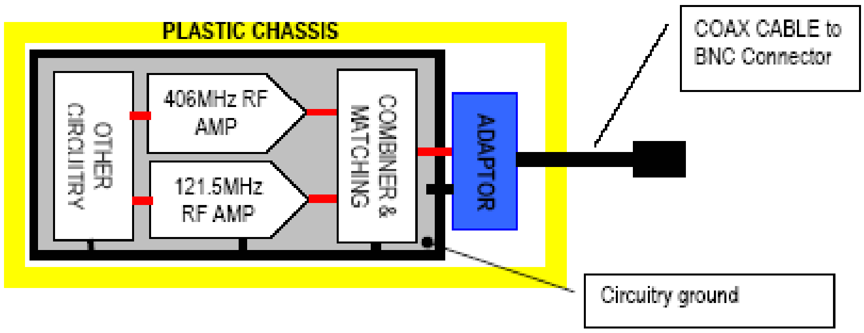


Figure 2 Test Configuration

Standard Communication Pty Ltd: Statement Regarding Build State 1

The MT410 and MT410G share the same antenna assembly. It comprises of a stainless steel wire with a rigid plastic base support over approximately the lower third.
When stowed, the greatest angle introduced into the wire is where it leaves the plastic assembly.
Two modifications have been introduced to correct any curvature of the antenna previously present after deployment:
a) The rigid plastic element has had a new feature introduced which supports the wire at its exit from the plastic support. This overcomes any slight curvature introduced from the stowage of the antenna at this point
b) The manufacture of stainless steel wire rope introduces residual stress into final the wire product. In some cases this results in a natural curvature developing over time (where the wire is not under tension such as in this antenna application). Subjecting the wire to industry standard wire straightening processes relieves these residual stress and removes the tendency of the wire to develop a curve [The wire straightening process typically applies a number bends, initially severe and which then decay to nil as the wire is passed through it].