

Thrane & Thrane A/S

TT-5000 Series



AERO-I SYSTEM INSTALLATION KIT PROVISIONS

Rev. 08/22/01



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Introduction

This section contains information on how to select installation provisions offered by ECS for Thrane & Thrane Aero-I Satcom systems. ECS designs and manufactures the installation provisions described below and can provide either individual components or complete installation kits.

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1.0 ECS RF Cable & Connector Specifications

ECS has designed a series of low-loss coaxial cables and connectors which can be utilized for the following antenna interface applications on this Satcom system (W3, W4, W5, W6, W7).

- W3 DLNA to Antenna
- W4 HPA to DLNA
- W5 SDU to DLNA
- W6 SDU to HPA
- W7 SDU to NRS GPS ANT
(Navigational Reference System)

1.1 ECS RF Cable & Connector Specifications

Table A

ECS Cable Part Number	310801	311201	311501	311601	352001	311901	3C142B
Nominal Attenuation at 1.6 GHz Frequency (dB/100/Ft)	4.6	6.7	9.10	10.85	14.76	15.80	18.13
Overall Diameter in Inches, (mm) Nominal	.452 (11.48)	.317 (8.05)	.229 (5.82)	.229 (5.82)	.162 (4.11)	.195 (4.95)	.195 (4.95)
Pounds/100Ft	15.0	8.6	5.2	5.0	2.70	4.3	4.0
Male TNC Straight	CTS022	CTS122	CTS922	CTS922	CTS3522	CTS722	CTS722
Male TNC 90 Degrees	CTR022	CTR122	CTR922	CTR922	CTR3522	CTR722	CTR722
ARINC 404 Size 5 RF Contact	N/A	N/A	620033*	620033*	P3522	620021	620021

*Must only be used with ITT Cannon ARINC Connectors.



1.2 RF Electrical Specifications

Thrane & Thrane has specified stringent electrical specifications which must either be met or exceeded for the following RF Coaxial Cable Assemblies.

	Assembly	Insertion Loss Max.	VSWR
Table B	DLNA to Antenna (W3) TT5004	0.6 dB* over TX and RX Band	1.5:1
	DLNA to Antenna (W3) TT5006	1.3 dB** over TX and RX Band	1.5:1
Table C	DLNA to HPA (W4) TT5004 & TT5006	1.0 dB over TX Band	1.5:1
Table D	SDU to DLNA (W5) TT5004 & TT5006	15 dB over RX Band	1.5:1
	SDU to HPA (W6) TT5004 & TT5006	12 dB over TX Band	1.5:1
Table E	SDU to NRS (W7) TT5006 & TT5008	16 dB over NRS Band	1.5:1

* Combined loss of W3 and W4 \leq 1.6 dB.
 ** Combined loss of W3 and W4 \leq 2.3 dB.

2.0 RF Cable Fabrication

(Refer to RF Coax Cable Kit Drawing, No. 500-8XXXX, Attachment B)

2.1 Part Numbering & Serialization

ECS manufactures RF cable assemblies guaranteed to meet system specifications. Every cable assembly is fabricated with an individual part number and serial number which is permanently affixed to each end of the assembly. Electrical profiles of these assemblies are stored in an ECS database to ensure traceability and repeatability.

2.2 Testing

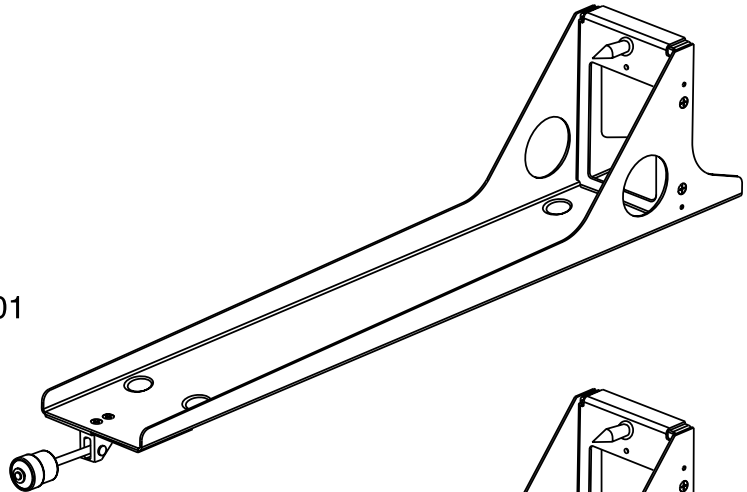
ECS tests all RF cable assemblies with a Network Analyzer to verify insertion loss and VSWR performance. The results become part of an ECS database and are shipped with each cable assembly. All cable assemblies are guaranteed to meet or exceed the electrical performance parameters set by Thrane & Thrane for the Aero-I System.

3.0

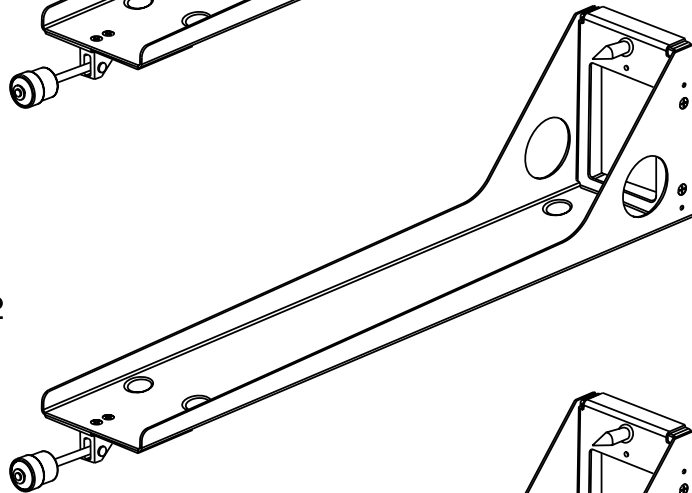
ARINC 404A Tray Assembly

(Refer to Dwg. P/N P0299,4201,200-82942) Attachment D, E, and F
ECS manufactures several 1/4 ATR tray assembly for this system. Standard components of this preassembled tray include one (1) 1/4 ATR short/short or extra short tray shell, one (1) ARINC 404 DPX2 Connector plate, one (1) insertion-only thumbscrew holddown assembly, one (1) rear guide pin and associated hardware.

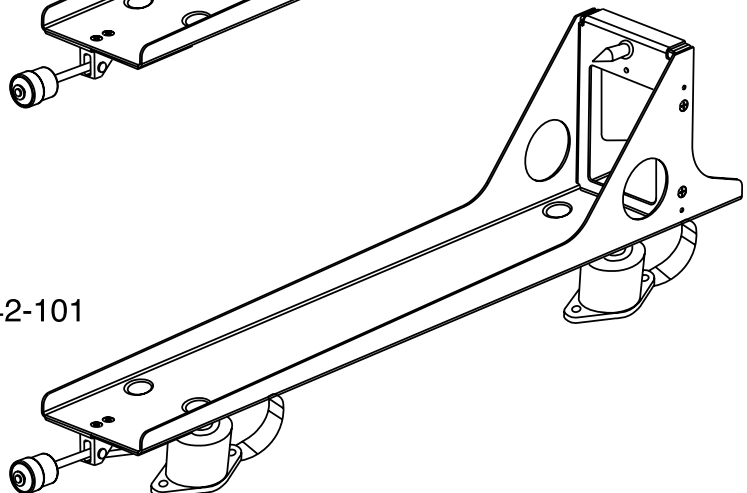
P/N P0299-101



P/N 4201-102



P/N 200-82942-101





4.0 Wire Harness Provisions

ECS Maintains stock on the following cable and wire necessary for the system installation provisions.

Quantity	Part Number	Description
A/R	352012 (See Attachment G)	12/C Composite Cable (W1) HPA to Antenna Phased array only
A/R	412205 (See Attachment H)	5/C Composite Cable (W2) HPA to SDU
A/R	22759/16-16-9 22759/16-20-9 20TE2T14A	16 AWG Single Cond. Wire 20 AWG Single Cond. Wire 20 AWG Twisted Shielded Pair
A/R	N/R	Misc. MIL-SPEC Wire

Note: An alternate wire selection may be approved by Thrane & Thrane/ECS

5.0 Wire Harness Assemblies

ECS can provide terminated, labeled and tested wire harness assemblies for the following interfaces (call ECS Customer Service for custom drawing information):

- HPA to Antenna (W1) - (Phased array antenna only)
- HPA to SDU/+28VDC/2 Twisted Pairs/Remote On-Off (W2)
- SDU to +28 VDC (W8)
- Handsets, Thrane & Thrane, WH-10
- SDU Miscellaneous Aircraft Wiring

6.0 Complete Installation Kits

ECS will provide complete standard or customized hardware provisioning installation kits to meet any aircraft requirement. The kit includes a S/S or S/L 1/4 ATR tray, ARINC connector, RF Cable Assemblies (either antenna system) HPA to antenna wire harnesses (phased array antenna), SDU to HPA power/communications with remote on/off wire harness, handset wire harnesses (Thrane & Thrane or WH-10), and SDU miscellaneous aircraft wiring.



7.0

Attachments

- A. AERO I Master Kit List 120-8XXXX
- B. AERO I RF Cable Assembly Kit 500-8XXXX
- C. AERO I Hardware Kit 120-8XXXX
- D. Tray Drawing P0299
- E. Tray Drawing 4201-100
- F. Tray Drawing 200-82942
- G. W1 HPA to Antenna Composite Cable (352012)
- H. W2 HPA to SDU Composite Cable (412205)

For additional information Contact:

Electronic Cable Specialists, Inc.

5300 West Franklin Drive

Franklin, Wisconsin 53132 USA

Toll Free: 800.327.9473

Phone: 414.421.5300

Fax: 414.421.5301

AERO I — Attachment A

For Reference Only

DWG. NO. 120-8XXXX	SHEET 1	REV. N/C
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	ANY CHANGES TO THIS DOCUMENT MUST BE SUBMITTED TO THE DESIGN/DRAFTING DEPARTMENT FOR PROPER UPDATE	ECN	SHEET	ZONE	REV.	BRIEF DESCRIPTION (SEE ECN FOR FULL DESCRIPTION)	DATE	APPROVED
		XXXX	1		N/C	NEW RELEASE		

NOTES:

- 1) ENSURE THAT ALL SUB-KITS HAVE BEEN ASSEMBLED PER APPLICABLE DRAWINGS.
- 2) BAG AND COMBINE SUB-KITS AND IDENTIFY AS FOLLOWS:

AERO-I SATCOM INSTALL. KIT
 ECS P/N 120-8XXXX-101
 REV. (CURRENT REVISION)

QTY	COMPONENTS PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ALTERNATE PART NUMBER	ITEM #
1	700-8XXXX-101	MISC. WIRING HARNESS KIT		3
1	120-8XXXX-101	INSTALLATION HARDWARE KIT		2
1	500-8XXXX-101	AERO-I RF COAX KIT		1
-101				
ASSY DASH NUMBER				

BILL OF MATERIALS

ALL LENGTHS IN INCHES		ELECTRONIC CABLE SPECIALISTS <small>FRANKLIN, WI 53132 PHONE: (414) 421-5300</small>											
APPROVALS	DATE	TITLE: THRANE & THRANE AERO-I SATCOM INSTALLATION MASTER KIT LIST											
DRAWN BY: C CHAPMAN	08/22/01												
CHECKED BY:		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="font-size: x-small;">SIZE</td> <td style="font-size: x-small;">CAGE CODE</td> <td style="font-size: x-small;">LEVEL</td> <td style="font-size: x-small;">DWG NO.</td> </tr> <tr> <td style="text-align: center; font-size: large;">B</td> <td style="text-align: center; font-size: large;">66197</td> <td style="text-align: center; font-size: large;">H</td> <td style="text-align: center; font-size: large;">120-8XXXX</td> </tr> </table>				SIZE	CAGE CODE	LEVEL	DWG NO.	B	66197	H	120-8XXXX
SIZE	CAGE CODE					LEVEL	DWG NO.						
B	66197	H	120-8XXXX										
DESIGNED BY:		SCALE:	FILE: G:\DRAFT\TEMPDWG\120-8XXXX-1		SHEET: 1 OF 1								
APPROVED BY:													
MFG. APPROVAL:													

AERO I — Attachment B1

For Reference Only

4

3

1

DWG. NO. 500-8XXXX	SHEET 1	REV. N/C
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CAD GENERATED DOCUMENT

ANY CHANGES TO THIS DOCUMENT MUST BE SUBMITTED TO THE DESIGN/DRAFTING DEPARTMENT FOR PROPER UPDATE

REVISIONS						
ECN	SHEET	ZONE	REV.	BRIEF DESCRIPTION (SEE ECN FOR FULL DESCRIPTION)	DATE	APPROVED
XXXX			N/C	NEW RELEASE		

NOTES: UNLESS OTHERWISE SPECIFIED

- 1 LABEL BOTH ENDS OF CABLE.
COVER ALL LABELS WITH CLEAR HEAT SHRINK.
APPLY BLACK ADHESIVE SHRINK TUBING ACCORDING TO ECS WORK INSTRUCTION 0007.
- 2. SHIP EACH KIT SEPARATELY. MARK OUTSIDE OF BOX WITH P.O. #, SERIAL #, AND CONTENTS DESCRIPTION PER EXAMPLE:
P.O. # XXXXX
SER # ESXXXX
500-8XXXX-101 AERO-I SATCOM RF COAX KIT
- 3 ECS COMPOSITE CABLE P/N 352012
AVAILABLE FOR W1 ANTENNA HARNESS.
- 4. INCLUDE APPROPRIATE TEST DOCUMENTATION WITH EACH SET.
- 5. MANUFACTURE CABLE ASSEMBLIES WITHIN TOLERANCE PER ECS WORK INSTRUCTION WI009.

KIT INFORMATION

500-8XXXX-101 SATCOM RF COAX KIT	X	X	X	X	X	X

KIT -101 INCLUDES COAX CABLES -01 THRU -05, (W3 THRU W7).

ITEM NO.	ASSEMBLY PART NO.	COMPONENTS PART NO.	DESCRIPTION	ITEM NO.
		BTF101	CONN, TNC BULKHEAD FEEDTHRU ADAPTER	7
		225791-2	CONTACT, ARINC 600 SIZE 5	6
		CNSX22	CONTACT, ARINC 600 SIZE 5	5
		CTSX22	CONN, TNC STRAIGHT	4
		CTR22	CONN, TNC RIGHT ANGLE	3
	TBD	TBD	3C142B COAXIAL CABLE, 50 OHM	2
		TBD	COAXIAL CABLE, 50 OHM LOW LOSS	1

BILL OF MATERIALS (RF COAX CABLES)

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ALL LENGTHS IN INCHES																																							
APPROVALS	DATE																																						
DRAWN BY: M TAUBENHEIM	8/22/01																																						
CHECKED BY:																																							
DESIGNED BY:																																							
PROJECT ENG:																																							
ENG. MGR:																																							
ELECTRONIC CABLE SPECIALISTS <small>FRANKLIN, WI 53132 PHONE: (414) 421-5300</small>																																							
TITLE: THRANE AND THRANE AERO-I SATCOM RF COAX CABLE KIT CONFIGURATIONS																																							
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SCALE:		FILE: G:\DRAFT\TEMPDWG\500-8XXXX-1																																					
		SHEET: 1 OF 3																																					

4

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AERO I — Attachment B2

For Reference Only

DWG. NO. 500-8XXXX	SHEET 2	REV. N/C
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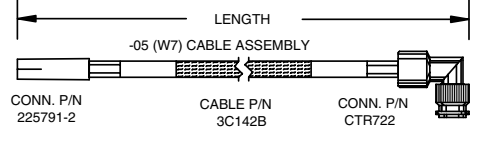
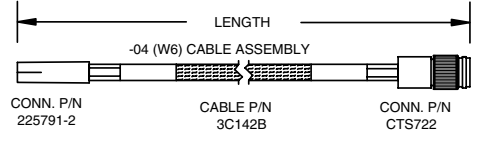
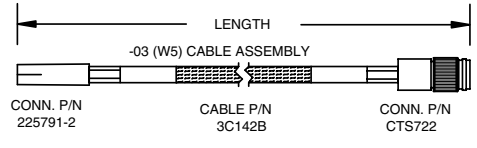
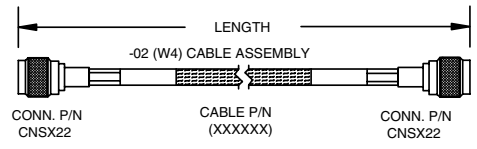
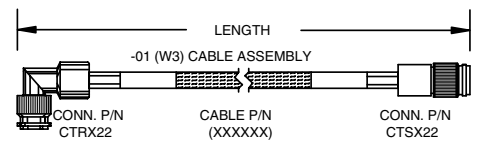
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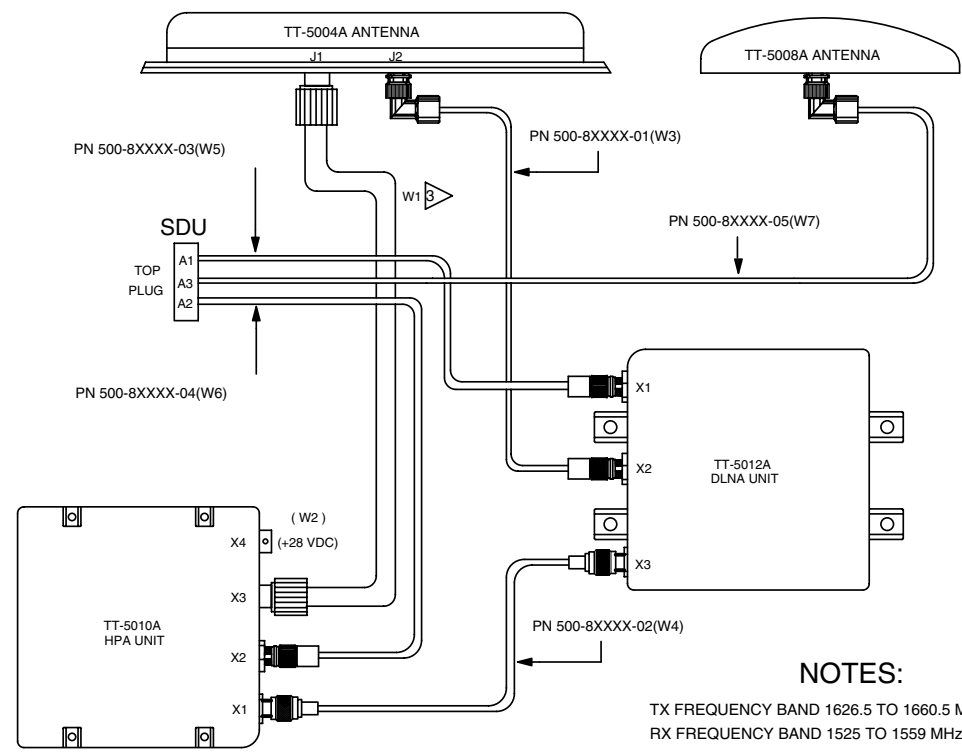


C

C

B

B



NOTES:

- TX FREQUENCY BAND 1626.5 TO 1660.5 MHz.
RX FREQUENCY BAND 1525 TO 1559 MHz.
1. W3 INSERTION LOSS < .6 dB @ TX & RX BAND.
 2. W4 INSERTION LOSS < 1.0 dB @ TX BAND.
 3. W5 INSERTION LOSS < 15 dB @ RX BAND.
 4. W6 INSERTION LOSS < 12 dB @ TX BAND.
 5. W7 INSERTION LOSS < 12 dB @ 1575.42 MHz.

RF CABLE LABELING



PN 500-8XXXX-01(W3)
SER# ESXXXX

PN 500-8XXXX-02(W4)
SER# ESXXXX

PN 500-8XXXX-03(W5)
SER# ESXXXX

PN 500-8XXXX-04(W6)
SER# ESXXXX

PN 500-8XXXX-05(W7)
SER# ESXXXX

A

A

		ELECTRONIC CABLE SPECIALISTS	
<small>FRANKLIN, WI 53132</small>		<small>PHONE: (414) 421-5300</small>	
SIZE B	CAGE CODE 66197	LEVEL	DWG. NO. 500-8XXXX
SCALE:		EFFECTIVITY:	
		SHEET: 2 OF 3	

4

3

2

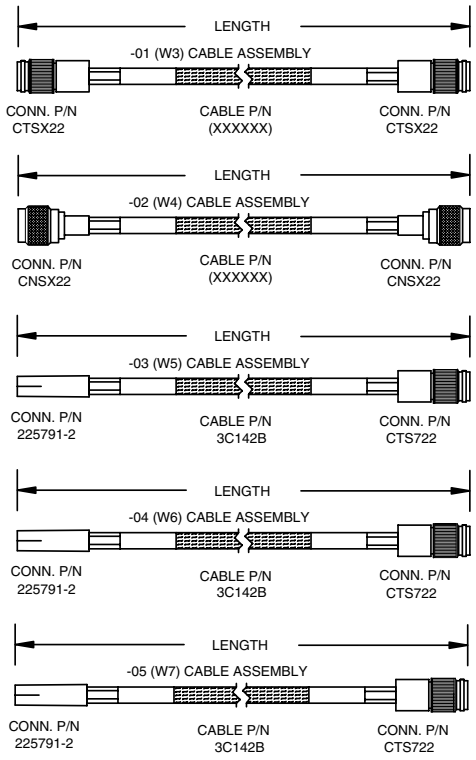
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TT-5004A ANT. CONFIG.

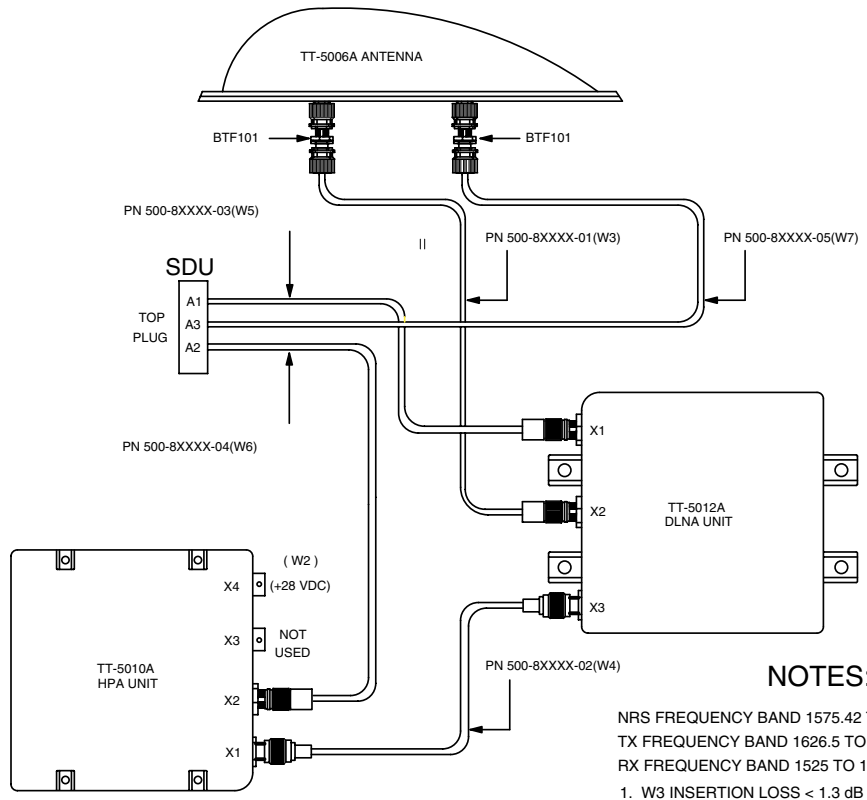
AERO I — Attachment B3

For Reference Only

DWG. NO. 500-8XXXX	SHEET 3	REV. N/C
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PN 500-8XXXX-01(W3) SER# ESXXXX	PN 500-8XXXX-02(W4) SER# ESXXXX	PN 500-8XXXX-03(W5) SER# ESXXXX
PN 500-8XXXX-04(W6) SER# ESXXXX	PN 500-8XXXX-05(W7) SER# ESXXXX	



- NOTES:**
- NRS FREQUENCY BAND 1575.42 TO 1576.42 MHz.
 - TX FREQUENCY BAND 1626.5 TO 1660.5 MHz.
 - RX FREQUENCY BAND 1525 TO 1559 MHz.
 - 1. W3 INSERTION LOSS < 1.3 dB @ TX & RX BAND.
 - 2. W4 INSERTION LOSS < 1.0 dB @ TX BAND.
 - 3. W5 INSERTION LOSS < 15 dB @ RX BAND.
 - 4. W6 INSERTION LOSS < 12 dB @ TX BAND.
 - 5. W7 INSERTION LOSS < 16 dB @ NRS BAND.

ELECTRONIC CABLE SPECIALISTS <small>FRANKLIN, WI 53132 PHONE: (414) 421-5300</small>			
SIZE B	CAGE CODE 66197	LEVEL	DWG NO. 500-8XXXX
SCALE	EFFECTIVITY:	SHEET: 3 OF 3	

TT-5006A ANT. CONFIG.

AERO I — Attachment C

For Reference Only

DWG. NO. 120-8XXXX	SHEET 1	REV. N/C
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	ANY CHANGES TO THIS DOCUMENT MUST BE SUBMITTED TO THE DESIGN/DRAFTING DEPARTMENT FOR PROPER UPDATE	ECN	SHEET	ZONE	REV.	BRIEF DESCRIPTION (SEE ECN FOR FULL DESCRIPTION)	DATE	APPROVED
		XXXX	1		N/C	NEW RELEASE		

NOTES:

- 1) ENSURE THAT ALL KITS HAVE BEEN ASSEMBLED PER RESPECTIVE DASH NO.
- 2) BAG KITS AND IDENTIFY PER EXAMPLE:
 AERO-I SATCOM INSTALL. HARDWARE KIT
 ECS P/N 120-8XXXX-101
 REV. (CURRENT REVISION)

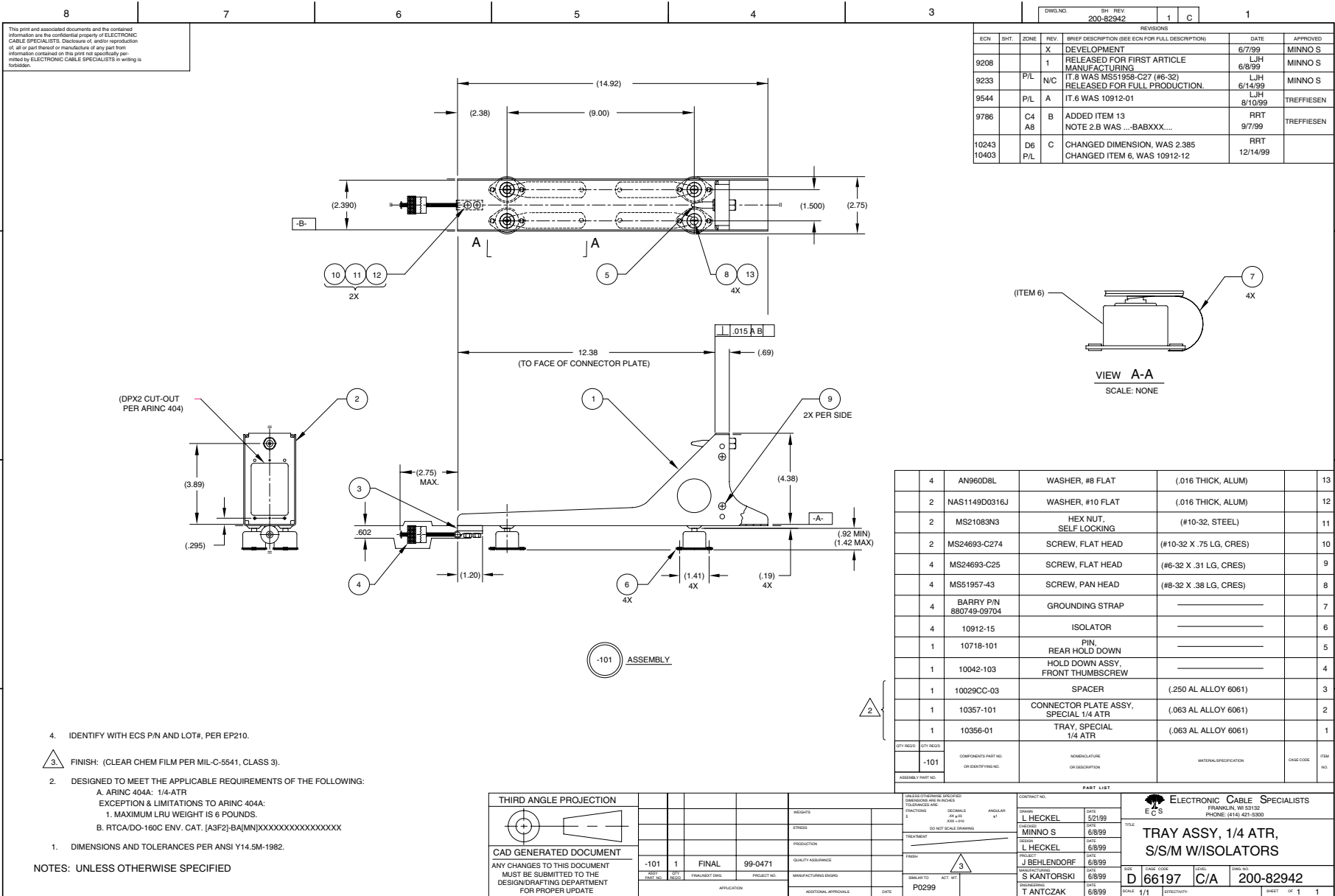
QTY	QTY	COMPONENTS PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	ALTERNATE PART NUMBER	ITEM #
1		4201-101	TRAY ASSY, 1/4 ATR EXTRA SHORT		7
	1	P0299-101	TRAY, 1/4 ATR SHORT/SHORT		6
1	1	D-SUB 15	SDU FRONT CONN., 15 PIN D-SUB		5
1	1	ARINC 404 CONN.	SDU TRAY REAR CONN. BLK		4
1	1	MIL-C-38999	CONN., RECP. 13 PIN FEMALE (W1)		3
2	2	MIL-C-38999	CONN, PLUG, 13 PIN MALE (W1)		2
A/R	A/R	352012	W1 COMPOSITE CABLE, 12 COND.		1
QTY	QTY				
-102	-101				
ASSY DASH NUMBER	ASSY DASH NUMBER				

BILL OF MATERIALS

ALL LENGTHS IN INCHES		ELECTRONIC CABLE SPECIALISTS FRANKLIN, WI 53132 PHONE: (414) 421-5300			
APPROVALS	DATE	TITLE: THRANE & THRANE AERO-I SATCOM INSTALL. HARDWARE KITS			
DRAWN BY: C CHAPMAN	8/22/01				
CHECKED BY:		SIZE	CAGE CODE	LEVEL	DWG NO.
DESIGNED BY:		B	66197	H	120-8XXXX
APPROVED BY:		SCALE:		FILE: G:\DRAFT\TEMPDWG\120-8XXXX-2	
MFG. APPROVAL:		SHEET: 1		OF 1	

AERO I — Attachment F

For Reference Only



AERO I — Attachment G

For Reference Only



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SH	1		REV	DESCRIPTION	DATE	APPROVED
			N/C	RELEASED BY ECN 7744		

DWG. NO. 352012-C

ECS P/N 352012 12 CONDUCTOR COMPOSITE CABLE

COMPONENTS

EIGHT 20 AWG SINGLE CONDUCTOR: M22759/16-20*
*COLOR CODE: WHITE, BLACK, BROWN, RED, ORANGE,
YELLOW, GREEN, BLUE

TWO 20 AWG TWISTED SHIELDED PAIRS: M27500A20TE2T14A
COLOR CODE: RED/BLUE, WHITE/BLUE

OVERALL

SHIELD: 36 AWG TC ROUND WIRE BRAID, 90% COVERAGE MINIMUM
JACKET: .013 WHITE FEP, .376 O.D. NOM

ECS avionic cables meet or exceed burn/smoke requirements as set forth by Federal Aviation Regulations Part 25. In addition, they are designed and manufactured with materials which, when subjected to flames or high temperatures, will not outgas corrosive and toxic hydrogen chloride produced by conventional PVC cables.

NOTE: ALL DIMENSIONS IN INCHES

APPROVALS	DATE
DRAWN BY C CHAPMAN	10/09/98
CHECKED BY	
ENGINEERING	

ELECTRONIC CABLE SPECIALISTS FRANKLIN, WI 53132 PHONE: (414) 421-5300	
TITLE CUSTOMER SPECIFICATION ECS CABLE P/N 352012	
SIZE A	CAGE CODE 66197
LEVEL	DWG. NO. 352012-C
SCALE	REV. N/C
SHEET	1 OF 1



AERO I — Attachment H

For Reference Only



REV. N/C	SH 1	This print and associated documents and the contained information are the confidential property of ELECTRONIC CABLE SPECIALISTS. Disclosure of, and/or reproduction of, all of part thereof or manufacture of any part from information contained on this print not specifically permitted by ELECTRONIC CABLE SPECIALISTS in writing is forbidden.	REVISIONS			
			REV	DESCRIPTION	DATE	APPROVED
			N/C	RELEASED BY ECN 7705		

DWG. NO. 412205-C

ECS P/N 412205

5 CONDUCTOR COMPOSITE CABLE

COMPONENTS

ONE 22 AWG SINGLE CONDUCTOR: M22759/16-22-9
COLOR CODE: WHITE

TWO 22 AWG TWISTED PAIRS: M27500A22TE2U00
COLOR CODE: RED, BLUE

OVERALL

SHIELD: 38 AWG TC ROUND WIRE BRAID, 90% COVERAGE MINIMUM
JACKET: .010 WHITE FEP, .192 O.D. NOM

ECS avionic cables meet or exceed burn/smoke requirements as set forth by Federal Aviation Regulations Part 25. In addition, they are designed and manufactured with materials which, when subjected to flames or high temperatures, will not outgas corrosive and toxic hydrogen chloride produced by conventional PVC cables.

NOTE: ALL DIMENSIONS IN INCHES

APPROVALS	DATE
DRAWN BY C CHAPMAN	10/01/98
CHECKED BY	
ENGINEERING	

ELECTRONIC CABLE SPECIALISTS <small>FRANKLIN, WI 53132 PHONE: (414) 421-5300</small>				
TITLE CUSTOMER SPECIFICATION ECS CABLE P/N 412205				
SIZE A	CAGE CODE 66197	LEVEL	DWG. NO. 412205-C	REV. N/C
SCALE		SHEET		1 OF 1

