

1	FCC Type Acceptance Report for ATC Mode "S" Transponder XS-950S/I Honeywell Inc. Drawing EB7517857, Rev. Original - Test Report Data - Functions of Semiconductors - Circuit Descriptions - Equipment Photographs - Personnel Qualifications
2	Honeywell Inc. Integrated Test Specification for the XS-850 Mode "S" Transponder, Drawing No. IT7517800, Rev. M
3	Honeywell Inc., Circuit Card Assembly, A1 Interconnect, Drawing No. 7517820-902, Rev. B
4	Honeywell Inc., Circuit Card Assembly, A2 Processor, Drawing No. 7517826-941, Rev. Original
5	Honeywell Inc., Circuit Card Assembly, XMTR/RCVR A3, Drawing No. 7517835-904, Rev. D
6	Honeywell Inc., Circuit Card Assembly, ATDL Power Supply Unit A4, Drawing No. 7517830-903, Rev. Original
7	Honeywell Inc., XS-950S/I Data Link Transponder Unit Assembly, Drawing No. 7519350, Rev. A
8	Honeywell Inc., Identification Plate (-45, -46), Drawing No. 7021570, Rev. AR with C.O. 103913 and 103927
9	Honeywell Inc., Outline and Installation XS-950S/I, Drawing No. 7519356, Rev. Original
10	Honeywell Inc., Interconnection Diagram – Transponder XS-950S/I, Publication No. 34-52-07 pages 423 thru 431.

ENGINEERING SPECIFICATION

SECURITY NOTATION

SPEC

NO.

EB7517857

CAGE

CODE 55939

REV LTR

ENGINEERING BULLETIN

CLASS

A

INITIAL RELEASE DATE

31-AUG-1999

DIVISION

CAS

DEPARTMENT NO.

5810

PRODUCT LINE NO.

3839

CONTRACT NO.

TITLE

XS-950S/I FCC TYPE ACCEPTANCE TEST REPORT

PREPARED BY

DATE

Jim Troxel

31-AUG-1999

APVD BY TECHNICAL MANAGER

DATE

P. Bobrowitz

31-AUG-1999

APVD BY TECHNICAL MANAGER

DATE

APVD FOR SCM

DATE

APVD FOR SQA

DATE

APVD FOR

DATE

REF AWAEB/PSAEB NO.

CHECKER

PRODUCT DESIGN CHECKER (FOR REF,
SPCL CONT PER EPM I-A-40)COGNIZANCE OF QE SUPVR (FOR REF,
SPCL CONT PER EPM I-A-40)

FOR PAGE INDEX, SEE CR-2. REVISION RECORD FOLLOWS PAGE INDEX

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COPY NO.

SECURITY NOTATION

AW/PS CRITICAL NOTATION

CR-1
TITLE PAGE

47 CFR 2.995d
47 CFR 87.133FREQUENCY STABILITY
Primary Power Supply
Variation

40

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SECTION IINTRODUCTION

This report consists of data establishing the conformance of the Honeywell Inc. XS-950S/I IFF and Mode S Data Link Transponder to the requirements established by the Federal Communications Commission in its rules and regulations (as referenced in Section II of this paper).

This Transponder is a derivative product from the XS-950 Mode S Transponder built by Honeywell. The XS-950S/I was retested and this new report submitted due to modifications to 3 transistors. The XS-950 Acceptance Test Report was released on 26 May 95, Specification No. EB7517808.

SECTION II**REFERENCES AND ATTACHMENTS****1.0 References**

Code of Federal Regulations, Title 47

Part 2, Subpart J

Part 87, Subpart D

XS-950 FCC TYPE ACCEPTANCE TEST REPORT, EB7517808

Environmental Conditions and Test Procedures for Airborne Equipment, RTCA DO-160D

2.0 Attachments

XS-950S/I End Item Assembly 7519350

Circuit Card Assembly - A1 Interconnect 7517820

Circuit Card Assembly - A2 Processor 7517826

Circuit Card Assembly - A3 Transmitter/Receiver 7517835

Circuit Card Assembly - A4 Power Supply / Modulator 7517830

Integrated Test Specification for the XS-950 Mode S IT7517800
Data Link TransponderOutline and Installation, 7519356
XS-950S/I Mode S/IFF TransponderInterconnect Diagram, XS-950S/I Mode S/IFF A15-3839-001
Transponder

Plate, Identification (115 VAC VERSION) 7021570-45

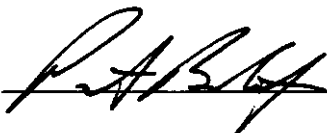
Plate, Identification (28 VDC VERSION) 7021570-46

SECTION III

TEST CERTIFICATION

I do hereby certify that to the best of my knowledge the technical test data contained in this report are true and correct.

SIGNED: _____



TEST ENGINEER

TEST ENGINEER QUALIFICATION

Pete Bobrowitz

1984 B.S.E.E. University of Wisconsin - Milwaukee

15 Years Experience In Commercial Avionics

SECTION IVGENERAL INFORMATION1.0 TYPE DESIGNATION

The equipment has been designated by Honeywell Inc., Commercial Aviation Systems, as an XS-950S/I Mode S and IFF Transponder.

2.0 SERVICE AND RULE FOR INTENDED OPERATION

Air Traffic Control

Part 87, Subpart A

3.0 DESCRIPTION OF EQUIPMENT

- 3.1 Type of Emission: 18MOP1D
- 3.2 Frequency Range: 1090 $\pm$ 1 MHz
- 3.3 Power Rating: 250 Watts Minimum, (Pulse)
- 3.4 Final Power Amplifier: Solid State Class C amplifier using a pair of MRF10502 silicon bipolar transistors.

3.5 Transistor Functions:

<u>Function</u>	<u>Transistor</u>	<u>Manufacturer</u>
Oscillator	AT00535	Hewlett Packard
Buffer Amplifier	CGY-50	Siemens
Buffer Amplifier	CGY-50	Siemens
Class A Amplifier	MRF1000MB	Motorola
Class C Amplifier	MRF10005	Motorola
Class C Amplifier	MRF10031	Motorola
Class C Amplifier	MRF10120	Motorola
Class C Final Amplifier	MRF10502	Motorola
Pulse Modulator	IRFR220	International Rectifier
Envelope Modulator	IRFR9220	International Rectifier

Voltage Regulator

IRF9540

International Rectifier

3.6 Circuit Diagram:

See attached schematics.

3.7 Instruction Book:

To Be Supplied As Soon As Possible

3.8 Tune-Up Procedure:

No field tuning is normally required. Tuning is done during manufacturing.

3.9 Oscillator Circuit:

The carrier frequency of 1090.0 MHz is generated by a varactor-tuned oscillator located on the Transmitter board. The primary frequency determining element is a ceramic coaxial resonator which provides good temperature stability and noise performance. The output of the oscillator is buffered by a Monolithic Microwave Integrated Circuit (MMIC) amplifier. This 1090 MHz RF signal is divided in frequency by 128 to 8.515625 MHz where it is compared in frequency and phase to a 8.515625 MHz crystal controlled reference oscillator. Any frequency or phase error is amplified by an active loop filter and corrections to the 1090 MHz oscillator are made by varying the varactor tuning voltage.

3.10 Frequency Stabilization:

Single channel phase-locked-loop synthesizer referenced to a crystal oscillator.

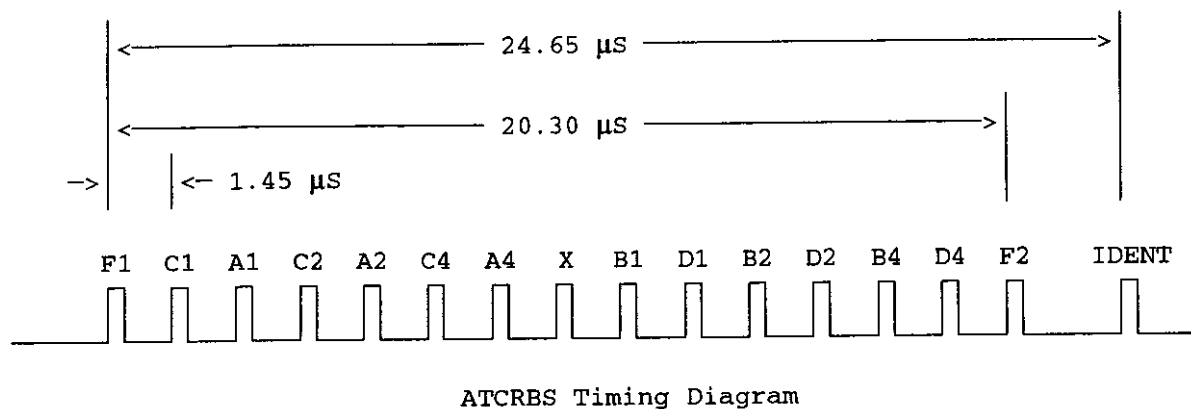
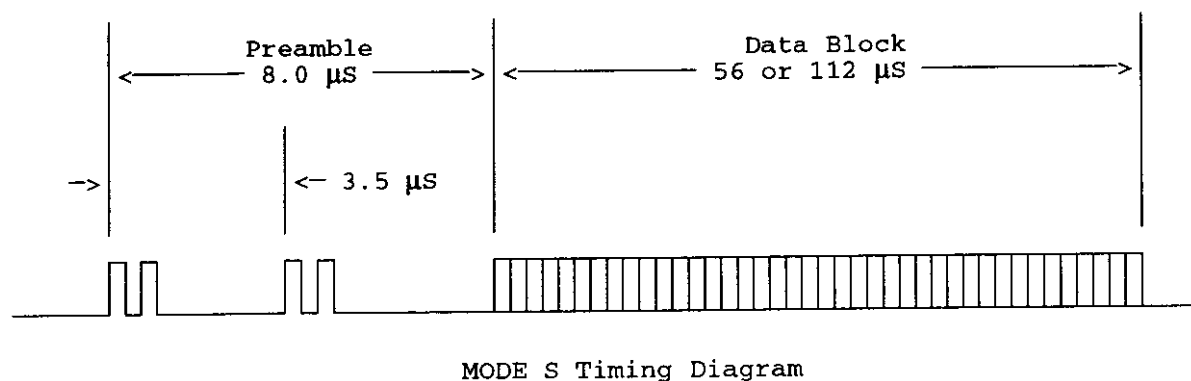
3.11 Modulation Limiting:

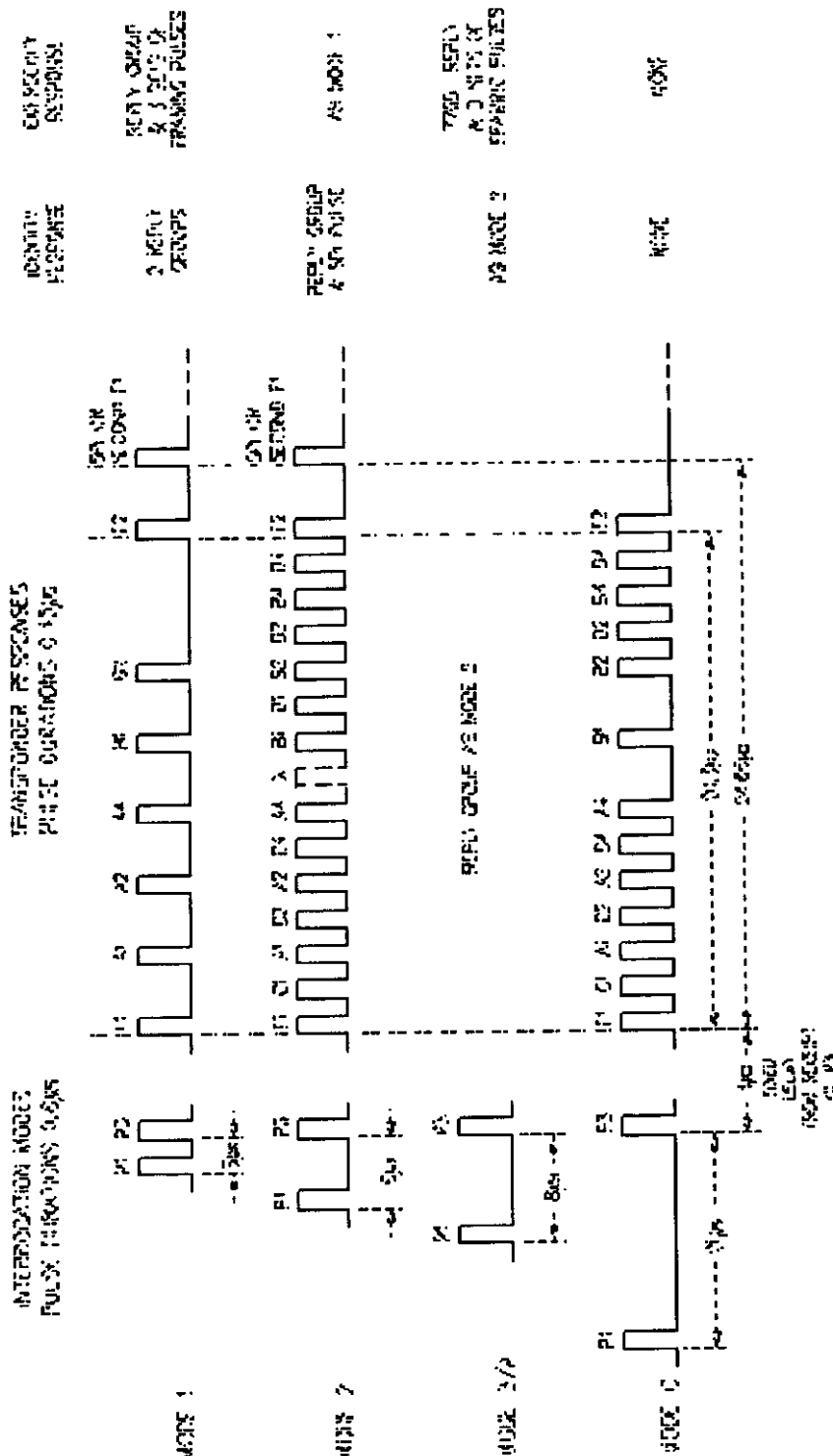
Not applicable

3.12 Radiated Interference Suppression:

Transmitter low-pass filter consisting of microstrip printed circuit elements (See Transmitter Schematic 7517835).

3.13 Reply Transmission Pulse Train

Pulse Widths (50% - 50%): $0.45 \pm 0.1 \mu\text{S}$ Rise Time (10% - 90%): $\leq 0.1 \mu\text{S}$ Fall Time (10% - 90%): $\leq 0.2 \mu\text{S}$ Pulse Widths: $0.5 \pm 0.05 \mu\text{S}$ or $1.0 \pm 0.05 \mu\text{S}$ Rise Time (10% - 90%): $\leq 0.1 \mu\text{S}$ Fall Time (10% - 90%): $\leq 0.2 \mu\text{S}$



Mode 1 and 2 Pulse Trains

4.0 PHOTOGRAPHS

<u>Photograph Number</u>	<u>View</u>	<u>Page</u>
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DCP-00770	View of Unit Side With A2 Processor Removed Showing A3 Transmitter/Receiver Assembly With Cover	15
DCP-00769	View of Unit Side with A3 Transmitter/Receiver Cover Removed.	16
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SECTION V

TEST PROCEDURES AND DATA

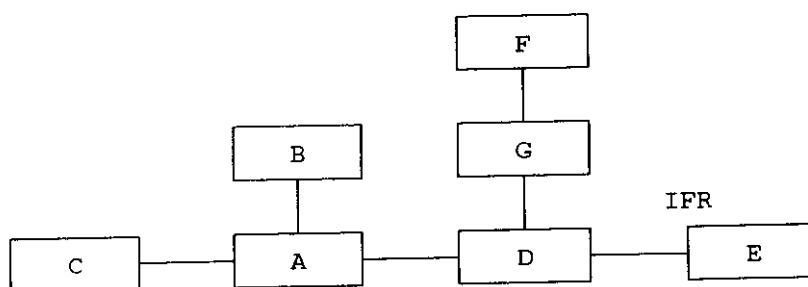
<u>Test Number</u>	<u>Description</u>	<u>Page</u>
1	Power Output	18
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3	Occupied Bandwidth and in Close Spurious	23
4A	Spurious Emissions (Conducted) 0-700 MHz	27
4B	Spurious Emissions (Conducted) 700 MHz --- 2000 MHz	30
4C	Spurious Emissions (Conducted) 2000 MHz --- 11500 MHz	32
5	Spurious Emissions (Radiated)	35
6	Frequency Stability (Temperature Variation)	38
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TEST NO: 1
Page NO: 1 OF 21.0 DESCRIPTION OF TEST: Power Output2.0 SPECIFICATIONS: 47 CFR 2.985a
47 CFR 2.985c
47 CFR 87.131

3.0 EQUIPMENT REQUIRED:

	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL. INST.	501TC	AV 52189
C	Personal Computer	DELL	OPTIPLEX	
D	Directional Coupler	WAVECOM	L-918-10	61
E	RF Generator	IFR	11404	D400485
F	Peak Power Analyzer	HP	8990A	D400012
G	Attenuator	Narda	776, 768	32114

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO: 1
Page NO: 2 OF 2

5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in Section 4.0 of this document.
2. Using the peak power meter, record the transponder output power under minimum and maximum reply pulse conditions. Note the frequency deviations relating to a change of the output power. (Mode-S rate 60/sec.; Mode A, C, 1, 2, 4 rate 1100/sec.)
3. Compute actual power using measured losses for coupler and attenuator.

6.0 DATA

6.1 Top Antenna measurements

TDR Mode	Reply Code	Path Loss	Actual Power	Freq
C	0000	52.0 dB	554 W	1090.33
A	7777	52.0 dB	554 W	1090.33
S	56 bit DF-11	52.0 dB	570 W	1090.31
IFF MODE 4	CODE A	52.0 dB	558 W	1090.31
IFF MODE 2	0000	52.0 dB	558 W	1090.32
IFF MODE 1	00	52.0 dB	558 W	1090.31

6.2 Bottom Antenna measurements

TDR Mode	Reply Code	Path Loss	Actual Power	Freq
C	0000	52.0 dB	538 W	1090.36
A	7777	52.0 dB	538 W	1090.35
S	56 bit DF-11	52.0	538 W	1090.31
IFF MODE 4	CODE A	52.0	538 W	1090.37
IFF MODE 2	0000	52.0	538 W	1090.36
IFF MODE 1	00	52.0	538 W	1090.36

TEST PERFORMED BY: Royal D. AmmonsDATE: 9/3/99

TEST NO: 2
Page NO: 2 OF 3

5.0 PROCEDURE:

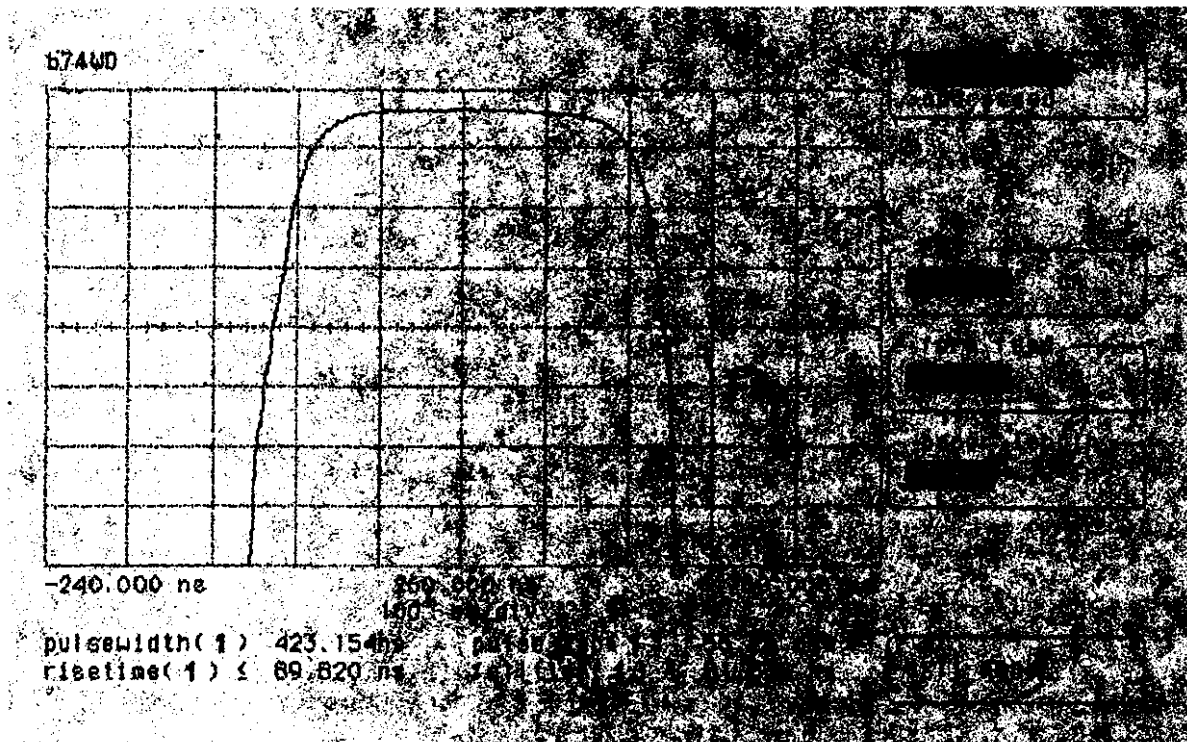
1. Connect the equipment as shown in the block diagram in Section 4.0 of this document.
2. Interrogate the Transponder at a 500 Hz rate and set the reply code to 7777.
3. Record the output pulse characteristics using the Peak Power Analyzer.

6.0 DATA

Pulse Characteristic	Measurement	Specification
Rise Time	91 nS	≤ 100 nS
Fall Time	77 nS	≤ 200 nS
Pulse Width	419 nS	450 ± 100 nS
Pulse Jitter	50 nS	≤ 100 nS

TEST NO: 2
Page NO: 3 OF 3

6.0 DATA (Cont.)



TEST PERFORMED BY:

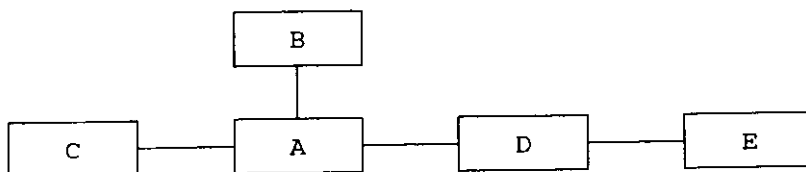
*Royce D. Simmons*DATE: 9/3/99

TEST NO: 3
Page NO: 1 OF 41.0 DESCRIPTION OF TEST: Occupied Bandwidth and In Close
Spurious2.0 SPECIFICATIONS: 47 CFR 2.989
47 CFR 87.135
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST.	501TC	AV 52189
C	Personl Computer	DELL	OPTIPLEX	
D	Attenuator	Narda	757C	32114
E	Spectrum Analyzer	HP	8566B	19065
F				
G				
H				
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO: 3
Page NO: 2 OF 4

5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in Section 4.0 of this document.
2. Insert sufficient attenuation as required for maximum dynamic range.
3. Use 300 kHz IF bandwidth on the Spectrum Analyzer and record spectrum level, for 1 MHz intervals from -25 MHz to +25 MHz.
4. Calculate the spectral energy density using the BASIC program listed below.

6.0 DATA:

```
DATA -9.66,-3.19,-18.13,-12.5,-19.42,-16.09,-24.23,-19.2,-19.69,
DATA -21.55,-33.19,-25.85,-27.08,-29.62,-35.49,-29.16,-34.23,
DATA -34.33,-35.52,-29.16,-42.14,-36.9,-35.82,-36.43,-39.65,-40.83,
DATA -35.97,-38.1,-38.21,-38.51,-38.28,-42.0,-38.37,-51.82,-39.91,
DATA -44.66,-40.59,-53.26,-41.06,-45.68,-44.77,-50.74,-43.33,
DATA -46.16,-45.14,-51.29,-49.02,-48.1,-50.81,-49.44
```

```
OPEN "OBW" FOR OUTPUT AS #1
110 DIM X(50)
120 DIM Y(50)
140 INPUT "ENTER CARRIER LEVEL"; X(0)
150 INPUT "ENTER NUMBER OF FREQ INCREMENTS"; K
160 A = 1 'INITIALIZE SUM TO CARRIER LEVEL
170 FOR I = 1 TO 2 * K - 1 STEP 2
180 READ X(I), X(I + 1) 'INPUT POWER LEVELS
190 X(I) = X(0) + X(I) 'CONVERT X(I) TO DBC
200 X(I + 1) = X(0) + X(I + 1) 'CONVERT X(I) TO DBC
210 Y(I) = 10 ^ (X(I) / 10) 'CONVERT X(I) TO LINEAR
220 Y(I + 1) = 10 ^ (X(I + 1) / 10) 'CONVERT X(I) TO LINEAR
230 A = A + Y(I) + Y(I + 1) 'SUM UP TOTAL POWER
240 NEXT I
250 INC = 1
260 PRINT #1, "FREQ OFFSET (MHZ)      LEVEL (DBC)      FREQ OFFSET (MHZ)      LEVEL
(DBC)"
270 FOR I = 1 TO K
280 J = I * INC
290 PRINT #1, USING "      +##.##      +##.##      "; -J; X(2 * I - 1); J;
X(2 * I)
300 NEXT I
310 PRINT #1,
320 PRINT #1, "PERCENT TOTAL ENERGY      OCCUPIED BANDWIDTH (MHZ)"
330 B = 1
340 PRINT #1, USING "      +###.##      +##.##      "; B / A * 100; INC
350 FOR I = 1 TO K
360 B = B + Y(2 * I - 1) + Y(2 * I)
370 PRINT #1, USING "      +###.##      +##.##      "; B / A * 100; (2
* I + 1) * INC
380 NEXT I
390 END
```

TEST NO: 3
PAGE NO: 3 OF 4

6.0 DATA (Cont.)

FREQ OFFSET (MHZ)	LEVEL (DBC)	FREQ OFFSET (MHZ)	LEVEL (DBC)
-1.0	-9.66	+1.0	-3.19
-2.0	-18.13	+2	-12.5
-3.0	-19.42	+3.0	-16.09
-4.0	-24.23	+4.0	-19.2
-5.0	-19.69	+5.0	-21.55
-6.0	-33.19	+6.0	-25.85
-7.0	-27.08	+7.0	-29.62
-8.0	-35.49	+8.0	-29.16
-9.0	-34.23	+9.0	-34.33
-10.0	-35.52	+10.0	-29.16
-11.0	-42.14	+11.0	-36.9
-12.0	-35.82	+12.0	-36.43
-13.0	-39.65	+13.0	-40.83
-14.0	-35.97	+14.0	-38.1
-15.0	-38.21	+15.0	-38.51
-16.0	-38.28	+16.0	-42.0
-17.0	-38.37	+17.0	-51.82
-18.0	-39.91	+18.0	-44.66
-19.0	-40.59	+19.0	-53.26
-20.0	-41.06	+20.0	-45.68
-21.0	-44.77	+21.0	-50.74
-22.0	-43.33	+22.0	-46.16
-23.0	-45.14	+23.0	-51.29
-24.0	-49.02	+24.0	-48.1
-25.0	-50.81	+25.0	-49.44

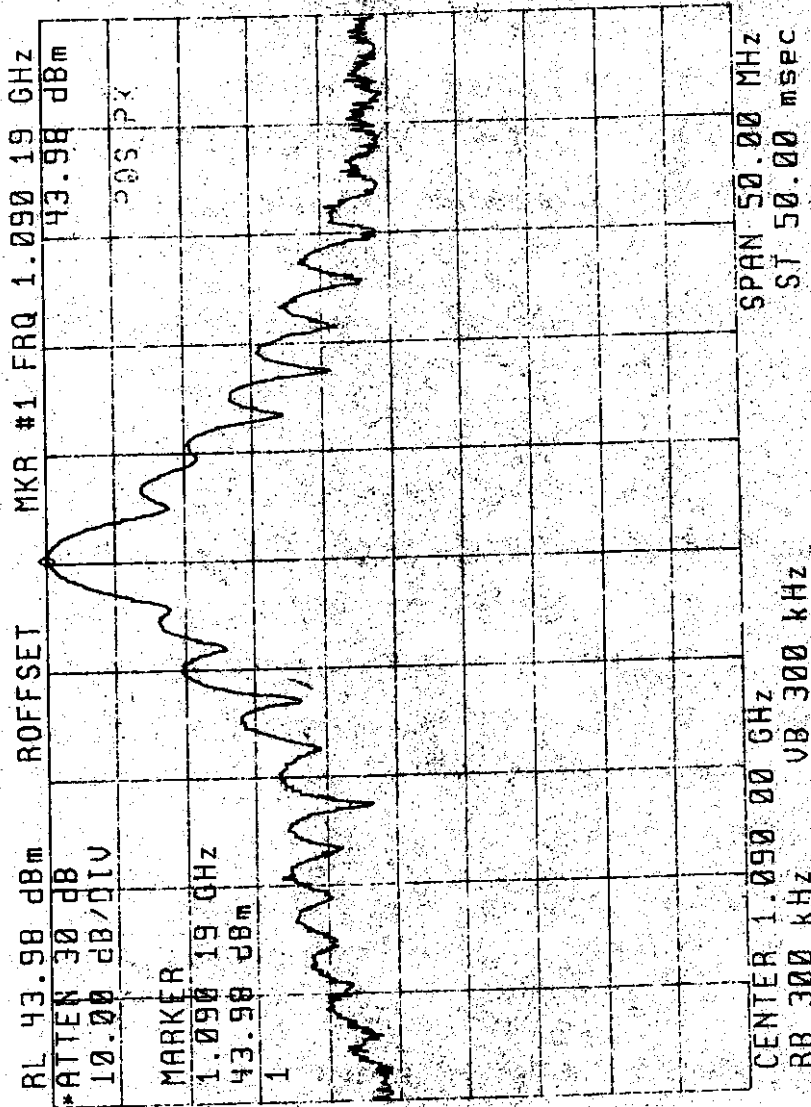
PERCENT TOTAL ENERGY

OCCUPIED BANDWIDTH (MHZ)

+57.4	+1.0
+91.2	+3.0
+95.3	+5.0
+97.4	+7.0
+98.3	+9.0
+99.3	+11.0
+99.5	+13.0
+99.6	+15.0
+99.7	+17.0
+99.8	+19.0
+99.9	+21.0
+99.9	+23.0
+99.9	+25.0
+99.9	+27.0
+99.9	+29.0
+99.9	+31.0
+100.0	+33.0
+100.0	+35.0
+100.0	+37.0
+100.0	+39.0
+100.0	+41.0
+100.0	+43.0
+100.0	+45.0
+100.0	+47.0
+100.0	+49.0
+100.0	+51.0

TEST NO: 3
Page NO: 4 OF 4

6.0 DATA (Cont.)



TEST PERFORMED BY: Royal D. Summario

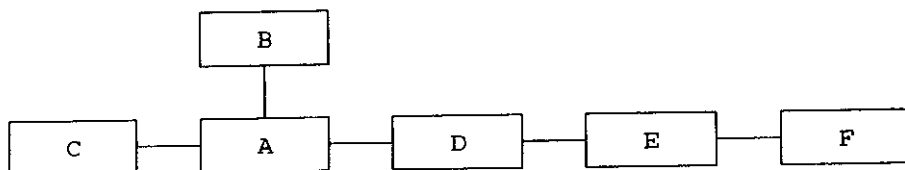
DATE: 9/3/99

TEST NO: 4A
PAGE NO: 1 OF 31.0 DESCRIPTION OF TEST: Spurious Emissions (Conducted)
0 - 700 MHz2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST	501TC	AV 52189
C	Personal Computer	DELL	OPTIPLEX	
D	Attenuator (10dB)	Arra	4410-10	978
E	Low Pass Filter	MicroLab/FXR	LA-07T	None
F	Spectrum Analyzer	HP	8566B	19065
H				
I				
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO: 4A
PAGE NO: 2 OF 3

5.0 PROCEDURE

1. Connect equipment as shown.
2. Adjust spectrum analyzer so that no signal exceeds the analyzer's dynamic range.
3. Measure and record all spurious emissions below 700 MHz (corrected for pad/filter/cable losses).

Mean Transmitter Power Calculation:

$$P_o = 550 \text{ Watts}$$

$$P_y = P_o * T_w * N * R$$

$$P_y = (550 \text{ W})(0.45 \mu\text{S})(15)(1100 \text{ Hz}) = 4.08 \text{ Watts}$$

Where:

 P_y = Mean output power (Watts) P_o = Peak output power (Watts) T_w = Pulse width (Seconds) N = Number of pulses R = Reply rate (Hz)

Therefore:

$$\begin{aligned} \text{Limit} &= 43 + 10\log_{10}(P_y) \\ &= 43 + 10\log_{10}(4.08 \text{ W}) \\ &= 43 + 6.1 \\ &= 49.1 \text{ dB} \end{aligned}$$

Spurious outputs must be attenuated at least 49.1dB.

TEST NO: 4A
PAGE NO: 3 OF 3

Peak Spurious Output Power Calculation:

$$\begin{aligned}P_o(\text{dBm}) &= 10\log_{10}(P_o \text{ W} * 1000 \text{ mW/W}) \\&= 10\log_{10}(550 \text{ W} * 1000 \text{ mW/W}) \\&= 57.4\text{dBm}\end{aligned}$$

$$\begin{aligned}P_s &= P_o(\text{dBm}) - \text{Limit}(\text{dBm}) \\&= 57.4\text{dBm} - 49.1\text{dBm} \\&= 8.3\text{dBm}\end{aligned}$$

Where:

 P_s = Peak Spurious Output Power

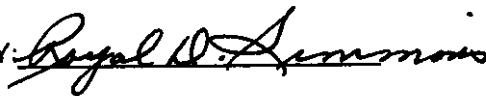
Therefore:

The peak output power of any spurious outputs must be lower than 8.3 dBm

6.0 DATA:

Frequency	Top Antenna Spurious Output Level (Corrected for Pad etc)	Bottom Antenna Spurious Output Level (Corrected for Pad etc)	Spurious Output Limit
52.5 MHz	-43.62 dBm	-45.15 dBm	+8.3 dBm
135.6 MHz	-69.2 dBm	-79 dBm	+8.3 dBm

TEST PERFORMED BY:

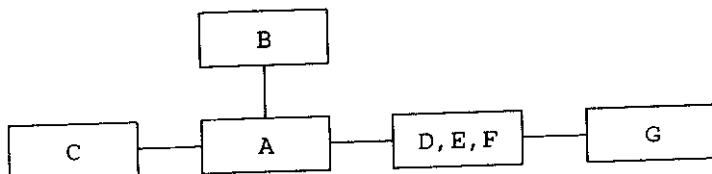
DATE: 9/3/99

TEST NO: 4B
PAGE NO: 1 OF 21.0 DESCRIPTION OF TEST: Spurious Emissions (Conducted)
700 MHz - 2000 MHz2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
Transponder	Honeywell	XS-950S/I	101
Power Supply	CAL INST	501TC	AV52189
Personal Computer	DELL	OPTIPLEX	
Attenuator (20dB)	Tenuline	8340-200	1149
Attenuator (20dB)	Tenuline	8340-200	1155
Attenuator (20dB)	Narda	757C	32114
Spectrum Analyzer	HP	8566B	AV58397
Plotter	HP	7475A	AV58285

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO: 4B
PAGE NO: 2 OF 2

5.0 PROCEDURE

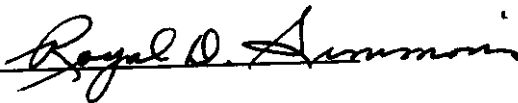
1. Connect equipment as shown.
2. Adjust spectrum analyzer so that no signal exceeds the analyzer's dynamic range.
3. Measure and record all spurious emissions between 700 MHz and 2000 MHz (corrected for pads and cable losses).

6.0 DATA:

Frequency	Top Antenna Spurious Output Level (Corrected for Pad etc)	Bottom Antenna Spurious Output Level (Corrected for Pad etc)	Spurious Output Limit
1090 MHz *	-80.5 dBm	-85 dBm	+8.3 dBm

* Transmitter in standby to measure Local Oscillator leakage.

TEST PERFORMED BY:

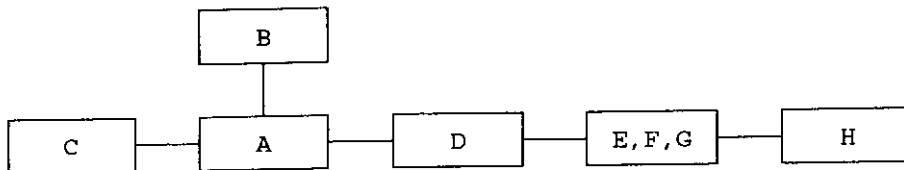
DATE: 7/3/99

TEST NO: 4C
PAGE NO: 1 OF 31.0 DESCRIPTION OF TEST: Spurious Emissions (Conducted)
2000 MHz - 11500 MHz2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
A	Transponder	Honeywell	XS-950S/I	101
B	Power Supply	CAL INST.	501TC	AV52189
C	Personal Computer	DELL	OPTIPLEX	
D	Attenuator (10dB)	Narda	3042B-10	07022
E	Hi Pass Filter(2GHz)	Microlab/FXR	HD-20N	None
F	Hi Pass Filter(4GHz)	Microlab/FXR	HD-40N	None
G	Hi Pass Filter(6GHz)	Microlab/FXR	HD-60N	None
H	Spectrum Analyzer	HP	8566B	19065
I	Plotter	HP	7475A	AV58285
J				
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO: 4C
PAGE NO: 2 OF 3

5.0 PROCEDURE

1. Connect equipment as shown.
2. Adjust spectrum analyzer so that no signal exceeds the analyzer's dynamic range. Resolution bandwidth should be set to 3 MHz.
3. Measure and record all spurious emissions between 2 GHz and 4 GHz using the 2 GHz High Pass filter.
4. Measure and record all spurious emissions between 4 GHz and 8 GHz using the 4 GHz High Pass filter.
5. Measure and record all spurious emissions between 8 GHz and 14 GHz using the 6 GHz High Pass filter.
6. Measure and record Pad/Filter/Cable losses for all spurious emissions.

6.0 CALIBRATION DATA:

Frequency	Applicable Filter Type	Calibration Factor (Pad/Filter/Cable)
2180 MHz	2000 MHz	12.0 dB
3270 MHz	2000 MHz	12.0 dB
4360 MHz	4000 MHz	12.4 dB
5450 MHz	4000 MHz	12.5 dB
6540 MHz	4000 MHz	12.9 dB
7630 MHz	4000 MHz	12.9 dB
8720 MHz	6000 MHz	13.3 dB
9810 MHz	6000 MHz	13.7 dB
10900 MHz	6000 MHz	12.8 dB
11990 MHz	6000 MHz	15.8 dB
13080 MHz	6000 MHz	14.1 dB

TEST NO: 4C
PAGE NO: 3 OF 3

6.0 MEASUREMENT DATA (Cont.)

Frequency	Top Antenna Spurious Output Level (Corrected for Pad etc)	Bottom Antenna Spurious Output Level (Corrected for Pad etc)	Spurious Output Limit
2180 MHz	Not Observed	Not Observed	+8.3 dBm
3270 MHz	-61.0 dBm	-60.0 dBm	+8.3 dBm
4360 MHz	Not Observed	Not Observed	+8.3 dBm
5450 MHz	Not Observed	Not Observed	+8.3 dBm
6540 MHz	Not Observed	Not Observed	+8.3 dBm
7630 MHz	Not Observed	Not Observed	+8.3 dBm
8720 MHz	Not Observed	Not Observed	+8.3 dBm
9810 MHz	Not Observed	Not Observed	+8.3 dBm
10900 MHz	Not Observed	Not Observed	+8.3 dBm
11990 MHz	Not Observed	Not Observed	+8.3 dBm
13080 MHz	Not Observed	Not Observed	+8.3 dBm

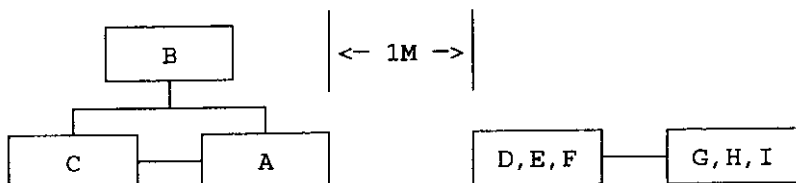
TEST PERFORMED BY: Royald. SammonsDATE: 9/3/92

TEST NO: 5
PAGE NO: 1 OF 31.0 DESCRIPTION OF TEST: Spurious Emissions
(Radiated)2.0 SPECIFICATIONS: 47 CFR 2.991
47 CFR 2.993
47 CFR 87.139

3.0 EQUIPMENT REQUIRED:

	<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
A	Transponder	Honeywell	XS-950	E3
B	Power Supply	Kepeco	ATE36-30M	63529
C	Personal Computer	DELL	OPTIPLEX	
D	Amplified Rod to 30MHz	Ailtech	94607-1	302
E	Ant. Horn 2-3.6 GHz	Ailtech	91889-2	E2430-103
F	Ant. Horn 3.6 - 7.5 GHz	Ailtech	94613-1	AV00842
G	Ant/ Cone 200MHz - 1 GHz	Ailtech	93490-1	0815
H	Field Int Meter 9-32 MHz	Carnel Lab	NM-17/27B	91-0117R
I	Field Int Meter 20MHz-1GHz	Carnel Lab	NM-37/57B	91-0770R
J	Field Int Meter 1-18GHz	Carnel Lab	NM-67B	91-0115R
K				
L				
M				
N				

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO 5
PAGE NO: 2 OF 3

5.0 PROCEDURE:

1. Connect equipment as shown in an open area.
2. Measure and record all spurious emissions using the appropriate antenna at a distance of 3 meters.
3. Calculate field strength using the recorded power measurement, antenna factor, and cable losses for each frequency.

6.0 DATA:

Transmitter field strength calculation:

(The transmitter field strength is calculated rather than measured for safety reasons)

$$P_{3m} = \frac{P_o G_t}{4\pi r^2} = \frac{(550) (1.66)}{4\pi (3)^2} = 8.07 \quad \frac{\text{Watts}}{\text{meter}^2}$$

$$e_{3m} = \sqrt{P_{3m} z_o} = \sqrt{(8.07) (377)} = 55.2 \quad \frac{\text{Volts}}{\text{meter}}$$

$$e_{3m} = 20 \log_{10} \left[e_3 \frac{V}{m} 10^6 \right] = 20 \log_{10} [(47.0) (10^6)] = 153.4 \quad \frac{\text{dB}\mu\text{V}}{\text{meter}}$$

Where:

 e_{3m} = Field strength at 3 meters G_t = Transmitter Antenna Gain = 2.2 dB for monopole over ground plane = 1.66 multiplication factor. P_o = Peak Output Power = 550 Watts for this unit P_{3m} = Power density at 3 meters z_o = Characteristic impedance of free space = 377 Ohms

In the previous section, we determined that spurious outputs must be attenuated by at least 49.1 dB.

Therefore the field strength of transmitted spurious shall be $154.8\text{dB}\mu\text{V} - 49.1\text{dB} = 105.7\text{dB}\mu\text{V}$

Note: Tests were performed with antenna to unit spacing of 1 Meter per RTCA DO-160 D.

TEST NO 5
PAGE NO: 3 OF 3

6.0 DATA (Cont.)

Frequency (MHz)	Level (dBμV/m)	Limit dBμV/m
28	27	105.7
32	26	105.7
144	30	105.7
160	33	105.7
220	36	105.7
280	28	105.7
320	26	105.7
350	26	105.7
520	35	105.7
550	36	105.7
1090 (1)	97	NONE
2180 (1)	76	105.7
3270 (1)	75	105.7

(1) Transmitter Transmitting into dummy load

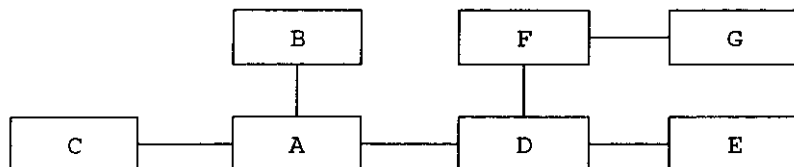
TEST PERFORMED BY: Raymond L. SumnerDATE: 9/3/99

TEST NO 6
PAGE NO: 1 OF 21.0 DESCRIPTION OF TEST: Frequency Stability
(Temperature Variation)2.0 SPECIFICATIONS: 47 CFR 2.995a
47 CFR 87.133

3.0 EQUIPMENT REQUIRED:

<u>TYPE</u>	<u>MANUFACTURER</u>	<u>MODEL</u>	<u>SER. NO</u>
Transponder	Honeywell	XS-950S/I	101
Power Supply	Kepco	ATE36-30M	63529
Personal Computer	DELL	OPTIPLEX	
RF Generator	IFR	1400/1404	D400485
Attenuator (30 dB)	Narda	757C	NONE
Frequency Counter	IFR	1400A/1404	D400485

4.0 BLOCK DIAGRAM OF TEST SETUP:



TEST NO 6
PAGE NO: 2 OF 2

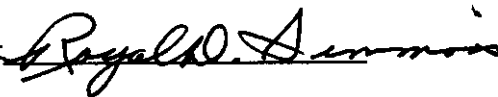
5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in section 4.0 of this document.
2. Set the temperature chamber to -20°C and allow the transmitter (non-operating) temperature to stabilize.
3. Record the transmission frequency for both the top and bottom antennas.
4. Repeat steps 2 and 3 at -10°C, 0°C, +10°C, +20°C, +30°C, and +40°C, and +50°C.

6.0 DATA

Temperature	Measured Frequency (Top Ant)	Measured Frequency (Bot Ant)	Frequency Limit
-20°C	1090.31 MHz	1090.37 MHz	1090 ± 1 MHz
-10°C	1090.31 MHz	1090.37 MHz	1090 ± 1 MHz
0°C	1090.36 MHz	1090.30 MHz	1090 ± 1 MHz
+10°C	1090.32 MHz	1090.36 MHz	1090 ± 1 MHz
+20°C	1090.32 MHz	1090.37 MHz	1090 ± 1 MHz
+30°C	1090.32 MHz	1090.37 MHz	1090 ± 1 MHz
+40°C	1090.33 MHz	1090.36 MHz	1090 ± 1 MHz
+50°C	1090.33 MHz	1090.36 MHz	1090 ± 1 MHz

TEST PERFORMED BY:

DATE: 9/3/99

TEST NO 7
PAGE NO: 2 OF 2

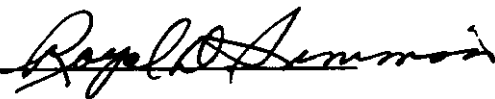
5.0 PROCEDURE:

1. Connect the equipment as shown in the block diagram in section 4.0 of this document.
2. For the 115VAC unit, vary the power supply voltage from -15% to + 15% of the nominal 115 VAC and record the transmitted frequency.
3. For the 28VDC unit, vary the power supply voltage from -15% to +15% of the nominal 27.5 VDC and record the transmitted frequency

6.0 DATA

115 VAC				
Power Supply Voltage (Vrms)	Power Supply Frequency (HZ)	Measured Frequency Top Antenna (MHZ)	Measured Frequency Bottom Antenna (MHZ)	Frequency Limit (MHZ)
97.75	392	1090.32	1090.37	1090 $\pm$ 1
	408	1090.32	1090.37	1090 $\pm$ 1
115	392	1090.32	1090.37	1090 $\pm$ 1
	408	1090.32	1090.37	1090 $\pm$ 1
132.25	392	1090.32	1090.37	1090 $\pm$ 1
	408	1090.32	1090.37	1090 $\pm$ 1

TEST PERFORMED BY:

DATE: 9/3/99

ENGINEERING SPECIFICATION		SECURITY NOTATION		SPEC NO. IT7517800		M REV LTR
				CAGE CODE 55939		
TYPE IT		CLASS A		INITIAL RELEASE DATE 29 SEP 95		
DIVISION BCAS	DEPARTMENT NO. 5810	PRODUCT LINE NO. 3839		CONTRACT NO.		
TITLE INTEGRATED TEST SPECIFICATION FOR THE XS-950 MODE S DATA LINK TRANSPONDER						
PREPARED BY J. Troxel		DATE 9/28/95	APVD BY TECHNICAL MANAGER R. Fuller		DATE 9/28/95	APVD BY TECHNICAL MANAGER DATE
APVD FOR SCM		DATE	APVD FOR SQA		DATE	APVD FOR DATE
REF AWAEB/PSAEB NO. EB7517801	CHECKER	PRODUCT DESIGN CHECKER (FOR REF, SPCL CONT PER EPM I-A-40)			COGNIZANCE OF QE SUPVR (FOR REF, SPCL CONT PER EPM I-A-40)	

FOR PAGE INDEX, SEE CR-2. REVISION RECORD FOLLOWS PAGE INDEX

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		CAGE CODE 55939	

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10	K	54	-	C-5	-				
11	-	55	-	C-6	-				
12	K	56	-	C-7	-				
13	K	57	L	C-8	-				
14	K	58	K	C-9	-				
15	-	59	L	C-10	-				
16	-	60	L	C-11	-				
17	-	61	L	C-12	-				
18	-	62	L	C-13	-				
19	-	63	L	C-14	-				
20	-	64	L	C-15	-				
21	-	65	L	C-16	-				
22	-	66	L	C-17	-				
23	-	67	M	C-18	-				
24	-	68	K	C-19	-				
25	-	69	L	C-20	-				
26	-	70	L	C-21	-				
27	-	71	L	C-22	-				
28	-			C-23	-				
29	-	Appendix A		C-24	-				
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A	SEE PAGE INDEX SHEET CR-2	C.O. 68772 (MAKE)	<i>[Signature]</i> 1 Nov 95	
B	SEE PAGE INDEX SHEET CR-2	C.O. 68773 (MAKE)	<i>[Signature]</i> 18 Jan 96	
C	SEE PAGE INDEX SHEET CR-2	C.O. 95464 (MAKE)	<i>[Signature]</i> 9 Aug 96	
D	SEE PAGE INDEX SHEET CR-2	C.O. 94595 (NA)	<i>[Signature]</i> 13 Nov 96	
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F	SEE PAGE INDEX SHEET CR-2	C.O. 96015 (NA)	<i>[Signature]</i> 24 Mar 97	
G	SEE PAGE INDEX SHEET CR-2	C.O. 95925 (MAKE)	<i>[Signature]</i> 24 Mar 97	
H	SEE PAGE INDEX SHEET CR-2	C.O. 98669 (MAKE)	<i>[Signature]</i> 13 Jan 98	
J	SEE PAGE INDEX SHEET CR-2	C.O. 98671 (MAKE)	<i>[Signature]</i> 13 Jan 98	
K	SEE PAGE INDEX SHEET CR-2	C.O. 102079 (BREAK IN*)	<i>[Signature]</i> 19 Feb 99	
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			CAGE CODE	55939	
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	3.3 To limit interference and power loss, it is recommended that transponder antenna cables be made of RG-214, or equivalent, 2 to 3 feet in length. 3.4 The transponder power output is specified at the antenna port. All power readings shall be corrected for antenna cable losses and variations in power meter specifications. 3.5 Where two antenna cables are required for testing diversity antenna operations, the two antenna cables shall be matched so that the cable loss between the two cables is within 0.2dB, and the propagation delay at 1090 MHz is within 10nsec. 4.0 POWER AND SIGNAL REQUIREMENTS 4.1 <u>Power Required</u> 115 Vac, 400 $\pm$ 10Hz / 200W minimum. Voltage variable from 90 to 140 Vac. 28 Vdc / 200W minimum. Voltage variable from 16 to 35 Vdc. 4.1 <u>Signals</u> All required signals are generated by the test equipment specified in this document. 5.0 TEST EQUIPMENT 5.1 <u>Honeywell Test Equipment</u> T336167 Manual Test Station or 4067839-901 Mode S Manual Test Station (MTS) Interface Panel. T336093-901 Mode S MTS Adaptor Panel T336094-901 XS-950 MTS Tray Assembly T336097-901 XS-950 DLP Test CCA T336098-901 XS-950 DLP Test Harness MT7517800 XS-950 Manufacturing Test Software 5.2 <u>Commercial Test Equipment</u> Personal Computer, IBM compatible, (80386 microprocessor) or better with the following minimum configuration: • 8 MB of RAM • VGA color monitor • Math co-processor • One serial port • 20MHz clock speed • Procomm Plus for Windows, Version 2.0 or later				
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		CAGE CODE 55939	
REV LTR	SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS.		
5 10 15 K L 20 25 30 35 40 45	DVM. FLUKE 8840 or equivalent. Oscilloscope. Tektronix 2465A or equivalent. <u>NOTE:</u> A Tektronix 2430A digital storage oscilloscope or equivalent is recommended for testing. Transponder Test Set, IFR ATC-1400A Mode S Auxiliary Unit, IFR Mode S-1403 Current meter, or DVM with current capability ARINC 429 Test Set, JC AIR 429E or equivalent 4.99K, 0.5% $\frac{1}{4}$ W resistor (Honeywell Part Number 2500169-459) Power Supply, HP6205B or equivalent 5.3 <u>OPTIONAL Test Equipment For Troubleshooting and Repair</u> T336096-901 XS-950 Boot Test Assembly Fluke 9100 with 9132FT-90960CA Pod.		
Honeywell		SECURITY NOTATION	SUPPLEMENTS 3 PAGE

ENGINEERING SPECIFICATION	SECURITY NOTATION	<table border="1"> <tr> <td data-bbox="812 69 941 136">SPEC. NO.</td> <td data-bbox="941 69 1321 136">IT7517800</td> </tr> <tr> <td data-bbox="812 136 941 210">CAGE CODE</td> <td data-bbox="941 136 1321 210">55939</td> </tr> </table>	SPEC. NO.	IT7517800	CAGE CODE	55939	<table border="1"> <tr> <td data-bbox="1321 69 1459 136">-</td> </tr> <tr> <td data-bbox="1321 136 1459 210">REV LTR</td> </tr> </table>	-	REV LTR
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CAGE CODE	55939								
-									
REV LTR									
REV LTR	SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS.								
7.0 7.1 5 10 15 20 25 30 35 40 45	7.0 TEST EQUIPMENT SETUP 7.1 <u>TEST SETUP #1</u> The following equipment settings define TEST SETUP #1: Table #7-1 MTS Interface Panel and Adaptor Default Switch Positions Table #7-4 MTS Connections for Synchro Input Testing Table #7-5 MTS Connections for ARINC 429 Receiver Input Testing Table #7-6 Default Settings for ATC 1400A and S1403 Test Sets Table #7-7 Default Settings for JC-AIR 429 Test Set Table #7-8 Default PC Settings (PROCOMM) 7.2 <u>Table #7-1 - MTS Interface Panel and MTS Adaptor Panel Default Switch Positions</u> For each panel, an "U" specifies switch is up, "D" specifies switch is down. <u>MTS Interface Panel Switch Settings</u> MODE S ADDR (1 to 24): UDUD UDUD UDUD UDUD UDUD UDUD ANT PGM: U ANT CABLE DELAY: DUD GILHAM ALT 1 & 2 (A1 A2 A4 B1 B2 B4 C1 C2 C4 D2 D4): DUD UDU UDU DU ANT BITE: U FUNC TEST: U STBY/ON: U SYNC ALT FLAG (1,2) UD ALT COMP: D ALT SRC: D ALT TYPE SEL: UD MAX AIRSPEED (15, 16, 17): UDU SDI (B, A): UD DATA LINK: U CNTL PNL: D AIR/GND (1, 2): UD 26VAC POL: (+) U <u>MTS Adaptor Panel Switch Settings</u> DISCRETE IN (1 to 4): UDUD ADL LINK A: D PDL LINK A: D PDL FUNC DISC (1 to 4): UDUD XPDR OFF (NO): D								
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REV LTR	SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS.			
5	7.3 <u>Table #7-2 - MTS Interface Panel and MTS Adaptor Panel Complement Switch Positions</u>			
10	For each panel, an "U" specifies switch is up, "D" specifies switch is down.			
15	<u>MTS Interface Panel Switch Settings</u>			
20	MODE S ADDR (1 to 24): DUDU DUDU DUDU DUDU DUDU DUDU D			
25	ANT PGM: UDU			
30	ANT CABLE DELAY: UDU DUD DUD UD			
35	GILHAM ALT 1 & 2 (A1 A2 A4 B1 B2 B4 C1 C2 C4 D2 D4):			
40	ANT BITE: D			
45	FUNC TEST: D			
50	STBY/ON: D			
55	SYNC ALT FLAG (1,2) DU			
60	ALT COMP: U			
65	ALT SRC: DU			
70	ALT TYPE SEL: DUD			
75	MAX AIRSPEED (15, 16, 17): DU			
80	SDI (B, A): D			
85	DATA LINK: U			
90	CNTL PNL: DU			
95	AIR/GND (1, 2): (+) U			
100	26VAC POL:			
105	<u>MTS Adaptor Panel Switch Settings</u>			
110	DISCRETE IN (1 to 4): DUDU			
115	ADL LINK A: U			
120	PDL LINK A: U			
125	PDL FUNC DISC (1 to 4): DUDU			
130	XPDR OFF(NO): D			
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		CAGE CODE	55939	
SEE FIRST PAGE FOR PROPRIETARY OR DATA RIGHTS NOTATIONS.				
REV LTR				
7.4	<u>Table #7-3 - MTS Interface Panel and MTS Adaptor Panel Switch Positions for Software Programming</u> For each panel, an "U" specifies switch is up, "D" specifies switch is down. Use the switch settings in Table #1 with the following exceptions: <u>MTS Interface Panel Switch Settings</u> FUNC TEST: SYNC ALT FLAG (1,2) ALT TYPE SEL: AIR/GND (1, 2): 26VAC POL: <u>MTS Adaptor Panel Switch Settings</u> DISCRETE IN (1 to 4): ADL LINK A: PDL LINK A:			
7.5	<u>Table #7-4 - MTS Connections for Synchro Input Testing</u> Connect the following signals on the MTS Interface Panel using test jumper cables: 26VAC REF H to SYNC ALT 1/2 RH. 26VAC REF C to SYNC ALT 1/2 RC. TEST VAC H to SYNC ALT 1/2 FX, FY, CX and CY. TEST VAC C to SYNC ALT 1/2 FZ and CZ. Adjust the amplitude of the TEST VAC signal to 9V RMS.			
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7.6 <u>Table #7-5 - MTS Connections for ARINC 429 Receiver Input Testing</u> Connect the output of the ARINC 429 test set (A and B as appropriate) to the following signals on the MTS Panels using test jumper cables: <u>MTS Interface Panel:</u> <table><tr><td>DATA LINK IN A/B</td><td>(J1A-2A/2B)</td></tr><tr><td>TX COORD A/B</td><td>(J1A-5E/5F)</td></tr><tr><td>MAINT DATA IN A/B</td><td>(J1B-6A/6B)</td></tr><tr><td>575 ADC 1 A/B</td><td>(J1A-6H/6J)</td></tr><tr><td>575 ADC 2 A/B</td><td>(J1B-5C/5D)</td></tr><tr><td>429 ADC 1 A/B</td><td>(J1A-7H/7J)</td></tr><tr><td>429 ADC 2 A/B</td><td>(J1B-5A/5B)</td></tr><tr><td>CNTL DATA A A/B</td><td>(J1A-7A/7B)</td></tr><tr><td>CNTL DATA B A/B</td><td>(J1A-7E/7F)</td></tr><tr><td>FLT ID A/B</td><td>(J1A-6A/6B)</td></tr></table> <u>MTS Adaptor Panel:</u> <table><tr><td>COM C/D IN A/B</td><td>(J1A-2C/2D)</td></tr><tr><td>ADL IN A/B</td><td>(J1A-6C/6D)</td></tr><tr><td>ADS IN A/B</td><td>(J1B-6J/7K)</td></tr><tr><td>MODE S ADDR IN A/B</td><td>(J1A-3F/3G)</td></tr><tr><td>PDL IN A/B</td><td>(WLJ1-1/2)</td></tr></table>					DATA LINK IN A/B	(J1A-2A/2B)	TX COORD A/B	(J1A-5E/5F)	MAINT DATA IN A/B	(J1B-6A/6B)	575 ADC 1 A/B	(J1A-6H/6J)	575 ADC 2 A/B	(J1B-5C/5D)	429 ADC 1 A/B	(J1A-7H/7J)	429 ADC 2 A/B	(J1B-5A/5B)	CNTL DATA A A/B	(J1A-7A/7B)	CNTL DATA B A/B	(J1A-7E/7F)	FLT ID A/B	(J1A-6A/6B)	COM C/D IN A/B	(J1A-2C/2D)	ADL IN A/B	(J1A-6C/6D)	ADS IN A/B	(J1B-6J/7K)	MODE S ADDR IN A/B	(J1A-3F/3G)	PDL IN A/B	(WLJ1-1/2)
DATA LINK IN A/B	(J1A-2A/2B)																																	
TX COORD A/B	(J1A-5E/5F)																																	
MAINT DATA IN A/B	(J1B-6A/6B)																																	
575 ADC 1 A/B	(J1A-6H/6J)																																	
575 ADC 2 A/B	(J1B-5C/5D)																																	
429 ADC 1 A/B	(J1A-7H/7J)																																	
429 ADC 2 A/B	(J1B-5A/5B)																																	
CNTL DATA A A/B	(J1A-7A/7B)																																	
CNTL DATA B A/B	(J1A-7E/7F)																																	
FLT ID A/B	(J1A-6A/6B)																																	
COM C/D IN A/B	(J1A-2C/2D)																																	
ADL IN A/B	(J1A-6C/6D)																																	
ADS IN A/B	(J1B-6J/7K)																																	
MODE S ADDR IN A/B	(J1A-3F/3G)																																	
PDL IN A/B	(WLJ1-1/2)																																	
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7.7 Table #7-6 - Default Settings for ATC 1400A and S1403 Test Sets <u>ATC 1400A Test Set</u> <table style="width: 100%; border: none;"> <tr><td style="width: 30%;">FREQ/FUNCT:</td><td>1030 Mhz, XPDR</td></tr> <tr><td>DELTA F:</td><td>0.00, OFF</td></tr> <tr><td>PRF/SQTR:</td><td>100, ON</td></tr> <tr><td>INTF PULSE:</td><td>000.0 OFF</td></tr> <tr><td>DISPLAY SELECT:</td><td>XPDR CODE</td></tr> <tr><td>DME REPLY EPF:</td><td>100</td></tr> <tr><td>XPDR MODE:</td><td>A</td></tr> <tr><td>RF LEVEL:</td><td>-73, CW/NORM/OFF: NORM</td></tr> <tr><td>TACAN:</td><td>OFF</td></tr> <tr><td>IDENT:</td><td>OFF</td></tr> <tr><td>F2/P2-F1/P1:</td><td>F1/P1</td></tr> <tr><td>TO/TAC/TD:</td><td>TO</td></tr> <tr><td>XDPR P2/P3 DEV:</td><td>0.00</td></tr> <tr><td> P2:</td><td>CAL</td></tr> <tr><td> P3:</td><td>CAL</td></tr> <tr><td>DME P2 DEV:</td><td>0.0</td></tr> <tr><td> P2:</td><td>CAL</td></tr> <tr><td>XPDR PULSEWIDTH:</td><td>0.00, CAL</td></tr> <tr><td>SLS/ECHO:</td><td>-0, OFF</td></tr> <tr><td>CAL MARKS:</td><td>1.45 Us</td></tr> <tr><td>CAL ϕ:</td><td>FULL CW</td></tr> <tr><td>INTRF PULSE WIDTH:</td><td>FULL CCW</td></tr> <tr><td>SUPPRESSOR:</td><td>OFF</td></tr> <tr><td> VAR:</td><td>Set for +18V pulse amplitude.</td></tr> <tr><td>RANGE/VEL/ACCEL:</td><td>00000, IN/OUT: OUT, NORM/-1NMI: -1NMI</td></tr> </table>				FREQ/FUNCT:	1030 Mhz, XPDR	DELTA F:	0.00, OFF	PRF/SQTR:	100, ON	INTF PULSE:	000.0 OFF	DISPLAY SELECT:	XPDR CODE	DME REPLY EPF:	100	XPDR MODE:	A	RF LEVEL:	-73, CW/NORM/OFF: NORM	TACAN:	OFF	IDENT:	OFF	F2/P2-F1/P1:	F1/P1	TO/TAC/TD:	TO	XDPR P2/P3 DEV:	0.00	P2:	CAL	P3:	CAL	DME P2 DEV:	0.0	P2:	CAL	XPDR PULSEWIDTH:	0.00, CAL	SLS/ECHO:	-0, OFF	CAL MARKS:	1.45 Us	CAL ϕ :	FULL CW	INTRF PULSE WIDTH:	FULL CCW	SUPPRESSOR:	OFF	VAR:	Set for +18V pulse amplitude.	RANGE/VEL/ACCEL:	00000, IN/OUT: OUT, NORM/-1NMI: -1NMI
FREQ/FUNCT:	1030 Mhz, XPDR																																																				
DELTA F:	0.00, OFF																																																				
PRF/SQTR:	100, ON																																																				
INTF PULSE:	000.0 OFF																																																				
DISPLAY SELECT:	XPDR CODE																																																				
DME REPLY EPF:	100																																																				
XPDR MODE:	A																																																				
RF LEVEL:	-73, CW/NORM/OFF: NORM																																																				
TACAN:	OFF																																																				
IDENT:	OFF																																																				
F2/P2-F1/P1:	F1/P1																																																				
TO/TAC/TD:	TO																																																				
XDPR P2/P3 DEV:	0.00																																																				
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DME P2 DEV:	0.0																																																				
P2:	CAL																																																				
XPDR PULSEWIDTH:	0.00, CAL																																																				
SLS/ECHO:	-0, OFF																																																				
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INTRF PULSE WIDTH:	FULL CCW																																																				
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RANGE/VEL/ACCEL:	00000, IN/OUT: OUT, NORM/-1NMI: -1NMI																																																				
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REV LTR	<u>S1403 Test Set</u> SMENU: (1) : FMT D, UF#16, RL=1, CL=0, AQ=0, MU=0..0, ADD=00000001 SMENU: (2) : FMT L, UF#16, Data=2525252525252525252525252525252525, ADD=52525252 SMENU: (3) : FMT L, UF#23, Data=1252525252525252525252525252525252, ADD=25252525 SMENU: (1) ON SMENU: (2) through (16), OFF CMENU: (1) : Func: (2) SEQ (Mode S Only) : RFLvl: +CABLE LOSS (dB) : P6: CAL, Wd= CAL, Dv= CAL : P2: CAL : AntB: OFF CMENU: (2) : Prepulse: OFF : Ext. Sync.: Out= OFF, Dv= +0.00; In = OFF : Pulse Power Gate:P 1 : Ext. Mod. In: OFF NOTE: Avarage cable loss in dB for RF cables in test set should be put in the RFLvl command field as a positive quantity. <u>7.8 Table #7-7 - Default Settings JC-AIR 429 Test Set</u> TX PARITY: ODD TX SPEED: HIGH RX SPEED: HIGH DISPLAY: DATA TRANSMIT MODE LABEL = 125 DATA = 2AAAAA WORD RATE = 25 Milliseconds <u>7.9 Table #7-8 - Default PC Settings (PROCOMM)</u> The PROCOMM program should be set up for the following settings (ALT-P) menu: Baud Rate 38,400 Baud Data Bits 8 Parity None Stop Bit 1 Port Appropriate COM Port When uploading software, the XMODEM protocol should be used.		
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	8.0 GENERAL TEST REQUIREMENTS. 8.1 <u>Initial Settings</u> Appendix A contains a procedure for making the initial adjustments to the transponder prior to testing. This procedure is intended as guideline only and it is not a requirement that it be followed exactly. The settings given are nominal values. Tolerance build-ups on any given module may make it desirable to deviate slightly from the given levels in order to meet the required Integrated Test specifications. 8.2 <u>Test Sequence</u> For final testing the test sequence is based on functional requirements, it is required that the tests be performed in the order given. 8.3 <u>Test Procedure</u> The Integrated Test Specification shall be performed in its entirety upon completion of any modifications or repairs to the unit under test. 8.5 <u>I.T. Test Procedure Convention</u> In the Procedure section, switch position column, of the Integrated Test Specification document the statement "TEST SETUP # 1" will be encountered at the beginning of each test section. This statement is included to allow the operator to break-in at any given section for troubleshooting. When encountered during the final testing of the module the operator will ignore the function and continue on with the next statement.		
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8.6 Boot Software Part Numbers and CRCs

For each end item dash number (7517800-xxxxx) and minimum hardware mod level, the corresponding BOOT software part number and Boot software CRC is shown in the table.

Table 8-1 - Boot Software

Dash No.	Minimum Hardware Mod	BOOT S/W (Part Number)	BOOT CRC
10XXX	-	PS7021600-901	4F28
20XXX	-	PS7021600-901	4F28
35XXX	-	PS7021600-901	4F28
65XXX	-	PS7021600-901	4F28

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8.7 Operational Software Part Numbers and CRCs

For each end item dash number (7517800-xxxxx) and software mod level, the corresponding Operational software part number and CRCs are shown. The operational CRCs are comprised of three segments, OPER, COMP and XLNX.

Table 8-2 - Operational Software

Dash No.	Software Mod	OPER S/W (Part Number)	OPER CRC	COMP CRC	XLNX CRC
10001	-	PS7021601-901	4F3E	E3B2	A80E
10002	B	PS7021601-903	AE1E	E3B2	4E4E
10002	C	PS7021601-904	18A6	E3B2	4E4E
10002	D	PS7021601-905	6B39	E3B2	4E4E
10003	E	PS4087090-907	E6CE	E3B2	4E4E
20012	F	PS7021601-906	7CE0	E3B2	4E4E
55001	-	PS7021601-901	4FE3	E3B2	A80E
55002	B	PS7021601-903	AE1E	E3B2	4E4E
55002	C	PS7021601-904	18A6	E3B2	4E4E
55002	D	PS7021601-905	6B39	E3B2	4E4E
65012	F	PS7021601-906	7CE0	E3B2	4E4E

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REV LTR	8.8 <u>Test Format Description</u> <table border="1"> <thead> <tr> <th><u>Column</u></th><th><u>Description</u></th></tr> </thead> <tbody> <tr> <td>Rev Ltr</td><td>This column is used to identify revised material.</td></tr> <tr> <td>Test No.</td><td>Tests are numbered in sequence.</td></tr> <tr> <td>Opr Limits</td><td>Unit under test (UUT) shall meet these limits when tested at other than manufacturing facility. When an item is marked OPTIONAL, the corresponding test is not required except as an aid in troubleshooting.</td></tr> <tr> <td>Test Description</td><td>These items are the parameters to which the UUT was designed and aid in troubleshooting by specifying the input and output signal terminals. All conditions required are not repeated for each test, and conditions established in previous test also apply.</td></tr> <tr> <td>Switch Pos</td><td>Positions to which switches must be set are listed in required order and are grouped to correspond to applicable Work Steps.</td></tr> <tr> <td>Work Steps</td><td>This column defines the operations necessary to perform a test and achieve a result. Set switches to designated positions before performing corresponding work step.</td></tr> <tr> <td>Mfg Limits</td><td>UUT shall meet these limits at final buyoff before customer delivery.</td></tr> </tbody> </table> K 8.9 The XS-950 Transponder shall be tested using test software as specified in EB7517804.			<u>Column</u>	<u>Description</u>	Rev Ltr	This column is used to identify revised material.	Test No.	Tests are numbered in sequence.	Opr Limits	Unit under test (UUT) shall meet these limits when tested at other than manufacturing facility. When an item is marked OPTIONAL, the corresponding test is not required except as an aid in troubleshooting.	Test Description	These items are the parameters to which the UUT was designed and aid in troubleshooting by specifying the input and output signal terminals. All conditions required are not repeated for each test, and conditions established in previous test also apply.	Switch Pos	Positions to which switches must be set are listed in required order and are grouped to correspond to applicable Work Steps.	Work Steps	This column defines the operations necessary to perform a test and achieve a result. Set switches to designated positions before performing corresponding work step.	Mfg Limits	UUT shall meet these limits at final buyoff before customer delivery.
<u>Column</u>	<u>Description</u>																		
Rev Ltr	This column is used to identify revised material.																		
Test No.	Tests are numbered in sequence.																		
Opr Limits	Unit under test (UUT) shall meet these limits when tested at other than manufacturing facility. When an item is marked OPTIONAL, the corresponding test is not required except as an aid in troubleshooting.																		
Test Description	These items are the parameters to which the UUT was designed and aid in troubleshooting by specifying the input and output signal terminals. All conditions required are not repeated for each test, and conditions established in previous test also apply.																		
Switch Pos	Positions to which switches must be set are listed in required order and are grouped to correspond to applicable Work Steps.																		
Work Steps	This column defines the operations necessary to perform a test and achieve a result. Set switches to designated positions before performing corresponding work step.																		
Mfg Limits	UUT shall meet these limits at final buyoff before customer delivery.																		
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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	1.0			<u>POWER ON CURRENT TEST</u> (-10xxx to -54xxx)	Test Setup #1		Connect Equipment per Figure 1 for Test Setup #1	
	1.1	0.3 to 1.0 Amps (RMS)		Apply 115 ± 2 Vac to unit.	<u>MTS Panel</u> 115VAC: ON		115VAC on MTS Panel	
	1.1				<u>MTS Adaptor</u> 115VAC: ON		115VAC on MTS Adaptor Panel	
	1.1			With the voltage applied and the unit in standby the current draw shall be as specified.			Apply power to the transponder module. The amp meter on the power supply shall be as specified.	0.3 to 1.0 Amps (RMS)
	1.1			Set the transponder for the maximum DELM reply rate of 10 16-segment DELM/second. Set +66V supply for the nominal voltage.			Type on PC: "DAC 80" "XREP M D16 10" "MON"	
	1.2	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
	1.3	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits.			The +66V display in the ON column shall be as specified.	50.0 to 60.0 Vdc (55.0 nom)
	1.3			Apply 97 ± 2 Vac to unit (LOW Line Voltage).			Adjust the supply to 97 Vac.	
	1.4	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
5	1.5	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 134 ± 2 Vac to unit (HIGH Line Voltage).			The +66V display in the ON column shall be as specified. Adjust the supply to 134 Vac.	50.0 to 60.0 Vdc (55.0 nom)
10	1.6	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 115 ± 2 Vac to unit (Nominal Line Voltage). Set the transponder to normal operational mode.			The +66V display in the ON column shall be as specified. Adjust the supply to 115 Vac. Type on PC: "<ESC>" "XON 1"	50.0 to 60.0 Vdc (55.0 nom)
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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE		SPECIFICATION	
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	2.0			<u>POWER ON CURRENT TEST</u> (-55xxx to -99xxx) Turn 115 Vac on for MTS circuitry <u>MTS Panel</u> 115VAC: ON <u>MTS Adaptor</u> 115VAC: ON Apply +27.5 Vdc to unit. <u>MTS Adaptor</u> 28VDC: ON	Test Setup #1		Connect Equipment per Figure 1 for Test Setup #1 <u>POWER ON CURRENT TEST</u> (-55xxx to -99xxx) 115VAC on MTS Panel 115VAC on MTS Adaptor Panel +27.5 Vdc to unit	
	2.1	0.7 to 1.3 Amp		With the voltage applied and the unit in standby the current draw shall be as specified. Set the transponder for the maximum DELM reply rate of 10 16-segment DELM/second. Set +66V supply for the nominal voltage.			Apply power to the transponder module. The amp meter on the power supply shall be as specified. Type on PC: "DAC 80" "XREP M D16 10" "MON"	0.7 to 1.3 Amps
	2.2	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
	2.3	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 18 ± 0.5 Vdc to unit (LOW Line Voltage).			The +66V display in the ON column shall be as specified. Adjust the supply to 18 Vdc.	50.0 to 60.0 Vdc (55.0 nom)
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	2.4	0000		Verify the PWR FAIL warning signal is not active.			The PWR FAIL display on the PC shall be as specified.	0000
	2.5	50.0 to 60.0 Vdc (55.0 nom)		Verify the +66VDC Power supply monitor is within specified limits. Apply 33 ± 0.5 Vdc to unit (HIGH Line Voltage).			The +66V display in the ON column shall be as specified. Adjust the supply to 33 Vdc.	50.0 to 60.0 Vdc (55.0 nom)
	2.6	50.0 to 60.0 Vdc (55.0 nom)		Veriry the +66VDC Power supply monitor is within specified limits. Apply 27.5 ± 0.5 Vdc to unit (Nominal Line Voltage). Set the transponder to normal operational mode.			The +66V display in the ON column shall be as specified. Adjust the supply to 27.5 Vdc. Type on PC: "<ESC>" "XON 1"	50.0 to 60.0 Vdc (55.0 nom)

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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	3.0			<u>RF SELF TEST</u>	Test Setup # 1		<u>RF SELF TEST</u>	
				Turn RF signal generator off.	ATC 1400A: RF LEVEL: OFF		Type on PC "XRF L"	
				Activate Long Mode S RF self-test interrogations				
	3.1	0000 0000		Verify self-test passes with no errors.			Wait a minimum of 15 seconds. The error count on PC shall be as specified.	0000 0000
				Return to normal operational mode			Type on PC "<ESC>" "XON 1"	
				Turn RF signal generator on.	ATC 1400A: RF LEVEL: ON			
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	4.0			<u>MONITOR TEST</u> Set the transponder for 100 Long Mode S replies/second	Test Setup # 1		<u>MONITOR TEST</u> Type on PC "<ESC>" "XREP M L 100" "DAC 00" "MON"	
	4.1	23.0 to 37.0 Vdc		Verify the input voltage (VIN) Monitor when transmitting is within specified limits.			The VIN monitor in the ON column shall be as specified.	24.0 to 36.0 Vdc
	4.2	61.0 to 73.0 Vdc (67.0 nom)		With the +66V set to the maximum voltage, verify the +66VDC Power Supply Monitor when transmitting is within specified limits. Set the transponder for the nominal +66V power supply voltage.			The +66V monitor in the ON column shall be as specified. Type on PC "<ESC>" "DAC 80" "MON"	62.0 to 72.0 Vdc (67.0 nom)
	4.3	55.0 to 67.0 Vdc (61.0 nom)		With the +66V set to the nominal voltage, verify the +66VDC Power Supply Monitor when transmitting is within specified limits.			The +66V monitor in the ON column shall be as specified.	56.0 to 66.0 Vdc (61.0 nom)
	4.4	35.0 to 44.0 Vdc (39.5 nom)		Verify the +40VDC Power Supply Monitor when transmitting is within specified limits.			The +40V monitor in the ON column shall be as specified.	36.0 to 43.0 Vdc (39.5 nom)
	4.5	28.0 to 38.0 Vdc (33.0 nom)		Verify the +33VDC Power Supply Monitor when transmitting is within the specified limits.			The +33V monitor in the ON column shall be as specified.	29.5 to 36.5 Vdc (33.0 nom)

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	4.6	23.0 to 33.0 Vdc (28.0 nom)		Verify the +28VDC Power Supply Monitor when transmitting is within the specified limits.			The +28V monitor in the ON column shall be as specified.	24.5 to 31.5 Vdc (28.0 nom)
	4.7	12.5 to 17.0 Vdc (14.5 nom)		Verify the +15VDC Power Supply Monitor when transmitting is within the specified limits.			The +15V monitor in the ON column shall be as specified.	13.0 to 16.5 Vdc (14.5 nom)
	4.8	-6.0 to -3.5 Vdc (-4.4 nom)		Verify the -5VDC Power Supply Monitor when transmitting is within the specified limits.			The -5V monitor in the ON column shall be as specified.	-5.5 to -3.75 Vdc (-4.4 nom)
	4.9	-17.0 to -12.5 Vdc (-14.4 nom)		Verify the -15VDC Power Supply Monitor when transmitting is within the specified limits.			The -15V monitor in the ON column shall be as specified.	-16.5 to -13.0 Vdc (-14.4 nom)
	4.10	-100.0 to -170.0 Vdc (-125.0 nom)		Verify the -150VDC Power Supply Monitor when transmitting is within the specified limits.			The -150V monitor in the ON column shall be as specified.	-105.0 to -165.0 Vdc (-125.0 nom)
	4.11	-2.0 to +12.0 Vdc (5.0 nom)		Verify the Transmitter Top PIN monitor when not transmitting is within the specified limits.			The Top PIN display in the OFF column shall be as specified.	0.0 to +10.0 Vdc (5.0 nom)
	4.12	-175.0 to -90.0 Vdc (-120.0 nom)		Verify the Transmitter Top PIN monitor when transmitting is within the specified limits.			The Top PIN display in the ON column shall be as specified.	-170.0 to -95.0 Vdc (-120.0 nom)

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
5	4.13	-2.0 to +12.0 Vdc (5.0 nom)		Verify the Transmitter Bottom PIN monitor when not transmitting is within the specified limits.			The Bot PIN display in the OFF column shall be as specified.	0.0 to +10.0 Vdc (5.0 nom)
10	4.14	-175.0 to -90.0 Vdc (-120.0 nom)		Verify the Transmitter Bottom PIN monitor when transmitting is within the specified limits.			The Bot PIN display in the ON column shall be as specified.	-170.0 to -95.0 Vdc (-120.0 nom)
15	4.15	Less than +0.3 Vdc (0.0 nom)		Verify the Transmitter top forward power monitor when not transmitting is within the specified limits.			The Top pwr display in the OFF column shall be as specified.	Less than +0.2 Vdc (0.0 nom)
20	4.16	Greater than +1.0 Vdc (3.0 nom)		Verify the Transmitter top forward power monitor when transmitting is within the specified limits.			The Top pwr display in the ON column shall be as specified.	Greater than +1.5 Vdc (3.0 nom)
25	4.17	Less than +0.3 Vdc (0.0 nom)		Verify the Transmitter bottom forward power monitor when not transmitting is within the specified limits.			The Bot pwr display in the OFF column shall be as specified.	Less than +0.2 Vdc (0.0 nom)
30	4.18	Greater than +1.0 Vdc (3.0 nom)		Verify the Transmitter bottom forward power monitor when transmitting is within the specified limits.			The Bot pwr display in the ON column shall be as specified.	Greater than +1.5 Vdc (3.0 nom)
35								
40	4.19	+18.0 to +32.0 Vdc (+22.0 nom)		Verify the Transmitter pulse modulation monitor when transmitting is within the specified limits.			The Pul mod display in the ON column shall be as specified.	+18.5 to +31.0 Vdc (+22.0 nom)
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	4.20	+20.0 to +32.0 Vdc (+26.0 nom)		Verify the Transmitter envelope modulation monitor when transmitting is within the specified limits.			The Env mod display in the ON column shall be as specified.	+22.0 to +30.0 Vdc (+26.0 nom)
	4.21	0.5 to 4.0 Vdc (2.0 nom)		Verify the Local Oscillator Level monitor when transmitting is within the specified limits.			The LO Level display in the ON column shall be as specified.	0.75 to 3.5 Vdc (2.0 nom)
	4.22	1.5 to 10.5 Vdc (6.5 nom)		Verify the Local Oscillator VCO tuning voltage monitor when transmitting is within the specified limits.			The VCO volt display in the ON column shall be as specified.	1.5 to 10.0 Vdc (6.5 nom)
	4.23	3.0 to 5.5 Vdc (4.1 nom)		Verify the Synthesizer Lock Detector monitor when transmitting is within the specified limits.			The Syn lock display in the ON column shall be as specified.	3.0 to 5.5 Vdc (4.1 nom)
	4.24	Less than 2.0 Vdc (1.0 nom)		Verify the Top Antenna Monitor is within the specified limits.			The Top Ant Mon display shall be as specified.	Less than 1.5 Vdc (1.0 nom)
	4.25	Less than 2.0 Vdc (1.0 nom)		Verify the Bottom Antenna Monitor is within the specified limits.			The Bot Ant Mon display shall be as specified.	Less than 1.5 Vdc (1.0 nom)
	4.26	20.0 to 70.0 Deg C.		Verify the Temperature Monitor is within the specified limits.			The Temp display shall be as specified.	20.0 to 70.0 Deg C.
	4.27	3.5 to 5.5 Vdc (4.1 nom)		Verify the Warm/Cold Detector is within the specified limits.			The Warm/Cold display shall be as specified.	3.5 to 5.5 Vdc (4.1 nom)
				Return to normal operational mode			Type on PC * <ESC> * XON 1 *	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	5.0			<u>TRANSMITTER FREQUENCY AND OUTPUT POWER</u>	Test Setup # 1		<u>TRANSMITTER FREQUENCY AND OUTPUT POWER</u>	
	5.1	1089.0 to 1091.0 MHz (1090.0 nominal)		<u>TRANSMITTER FREQUENCY</u> Verify Transmitter Frequency on the BOTTOM Antenna is within the specified limits. <u>TRANSMITTER POWER OUTPUT</u> Set ATC test set to measure first pulse of a Long Mode S Reply.	ATC 1400A: F1/P1 F2/P2: F2/P2 S1403: C MENU: 2 Pulse Power Gate:P 1		<u>TRANSMITTER FREQUENCY</u> The XMTR/FREQ display on the ATC 1400A shall be as specified. <u>TRANSMITTER POWER OUTPUT</u> Set IFR 1400A to measure F2/P2. Set the S1403 to measure first pulse in the reply. NOTE: All attenuations for cable losses must be compensated for when making power measurements per paragraph 3.4.	1089.25 to 1090.75 MHz (1090.0 nominal)
	5.2	250 to 630 Watts		Verify Transmitter power on the BOTTOM Antenna, First Pulse of reply is within the specified limits. Set ATC test set to measure last pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 115		The XMTR PWR display on the ATC 1400A shall be as specified. Set the S1403 to measure the last pulse in the reply.	325 to 630 Watts
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	5.3	250 to 630 Watts		Verify Transmitter power on the BOTTOM Antenna, Last Pulse of reply is within specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts
	5.4	-2.0dB to +2.0dB		Verify the pulse droop (first to last pulse) of the reply is within the specified limits.			Calculate the ratio in dB between the power in test 5.2 and 5.3 according to the following formula: $10 \cdot \text{Log}_{10} [\text{Power } 5.2 / \text{Power } 5.3]$ The ratio shall be as specified.	-1.5dB to +1.5dB
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
				Set ATC test set to measure first pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 1		Set the S1403 to measure the first pulse in the reply.	
	5.5	250 to 630 Watts		Verify Transmitter power on the TOP Antenna, First Pulse of reply is within the specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts
				Set ATC test set to measure last pulse of a Long Mode S Reply.	S1403: Pulse Power Gate:P 115		Set the S1403 to measure the last pulse in the reply.	
	5.6	250 to 630 Watts		Verify Transmitter power on the TOP Antenna, Last Pulse of reply is within specified limits.			The XMTR PWR display on the ATC 1400A shall be as specified.	325 to 630 Watts
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	5.7	-2.0dB to +2.0dB		Verify the pulse droop (first to last pulse) of the reply is within the specified limits. Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403. Set ATC test set to measure first pulse of a Long Mode S Reply.			Calculate the ratio in dB between the power in test 5.5 and 5.6 according to the following formula: $10 \cdot \log_{10} [\text{Power 5.5} / \text{Power 5.6}]$ The ratio shall be as specified. Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A. Set the S1403 to measure the first pulse in the reply. Set IFR 1400A to measure F1/P1.	-1.5dB to +1.5dB

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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	6.0			<u>TRANSMITTER REPLY PULSE WIDTH, RISE AND FALL TIME</u> Select the TOP antenna. With the transponder set to reply to 100 Long Mode S replies/second, connect the test equipment to measure the transmitter reply pulse characteristics.	Test Setup #1 S1403: C MENU: 1 FUNC: 2 AntB: +.00		<u>TRANSMITTER REPLY PULSE WIDTH, RISE AND FALL TIME</u> NOTE: The XMTR Detector on the S1403 <u>MUST</u> be used to measure transmitter reply pulse characteristics. Setup the oscilloscope for the following configuration: CH1: S1403 XMTR Det CH2: OFF TRIGGER A: CH1, Slope+ A-SWP: 20usec B-SWP: 50nsec B-Delayed mode.	
	6.1	50 nsec to 100 nsec		Check the rise time (time between 10% to 90% voltage point on the pulse) of the second preamble pulse of the reply.			Set B-Delay to measure the rising edge of the second preamble pulse of the reply. The rise time (time between 10% to 90% voltage points) on the oscilloscope shall be as specified.	50 nsec to 100 nsec
	6.2	450 nsec to 550 nsec (500 nominal)		Check the pulse width (time between 50% to 50% voltage point on the pulse) of the second preamble pulse of the reply.			Set B-SWP to 100nsec and B-Delay to measure the pulse width of the second preamble pulse of the reply. The pulse width (time between 50% to 50% voltage points) on the oscilloscope shall be as specified.	450 nsec to 550 nsec (500 nominal)

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	6.3	50 nsec to 200 nsec		Check the fall time (time between 90% to 10% voltage point on the pulse) of the second preamble pulse of the reply.			Set the B-SWP to 50nsec and B-Delay to measure the falling edge of the second preamble pulse of the reply. The fall time (time between 90% to 10% voltage points) on the oscilloscope shall be as specified.	50 nsec to 200 nsec
	6.4	50 nsec to 100 nsec		Check the rise time (time between 10% to 90% voltage point on the pulse) of the last pulse of the reply.			Set B-Delay to measure the rising edge of the last pulse of the reply. The rise time (time between 10% to 90% voltage points) on the oscilloscope shall be as specified.	50 nsec to 100 nsec
	6.5	450 nsec to 550 nsec (500 nominal)		Check the pulse width (time between 50% to 50% voltage point on the pulse) of the last pulse of the reply.			Set B-SWP to 100nsec and B-Delay to measure the pulse width of the last pulse of the reply. The pulse width (time between 50% to 50% voltage points) on the oscilloscope shall be as specified.	450 nsec to 550 nsec (500 nominal)
	6.6	50 nsec to 200 nsec		Check the fall time (time between 90% to 10% voltage point on the pulse) of the last pulse of the reply.			Set the B-SWP to 50nsec and B-Delay to measure the falling edge of the last pulse of the reply. The fall time (time between 90% to 10% voltage points) on the oscilloscope shall be as specified.	50 nsec to 200 nsec
				Turn the TOP antenna off.			Antenna B OFF	

S1403:
C MENU: 1
AntB: OFF

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	
	7.0			<u>ATCRBS CODE</u> <u>VERIFICATION, REPLY</u> <u>DELAY AND JITTER</u> Interrogate the transponder with 1000 ATCRBS Mode A Interrogations at -40 dBm.	Test Setup # 1 <u>SI403:</u> C MENU: 1 FUNC: 1 <u>ATC 1400A:</u> XPDR MODE: A PRF/SQTR: 1000 RF LEVEL: -40 dBm		<u>ATCRBS CODE</u> <u>VERIFICATION, REPLY</u> <u>DELAY AND JITTER</u> ATC (ATCRBS Only) mode. Mode A 1000 Interogations/sec -40dBm	
	7.1	55% to 75% (65% nominal)		Verify the transponder limits replies to ATCRBS interrogations. Interrogate the transponder with 100 ATCRBS Mode A Interrogations at MTL+3dB.	<u>ATC 1400A:</u> PRF/SQTR: 100 RF LEVEL: -73 dBm		The XPDR %REPLY display on the ATC 1400A shall be as specified. 100 Interrogations/sec -73dBm	55% to 75% (65% Nominal)
	7.2	3.0 to 3.4 usec		Verify the P3 to F1 reply delay is within the specified limits.			The RpDly display on the SI403 shall be as specified.	3.0 to 3.4 usec
	7.3	Less than 0.2 usec		Verify the reply jitter over at least a 10 second interval is within the specified limits.			The absolute value of the difference between the minimum value and maximum value of the RpDly display on the SI403 over a 10 second period of time shall be as specified.	Less than 0.175 usec
				Set ATC CODE to 2525.			Type on PC "XATC 2525 2525"	
	7.4	2525		Verify the ATC CODE of the Mode A Reply is as specified.			The ATC CODE display of the 1400A shall be as specified.	2525

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	7.5	ID5252		Set ATC CODE to 5252 with IDENT. Verify the ATC CODE of the Mode A Reply is as specified. Interrogate the transponder with ATCRBS Mode C Interrogations. Set Mode C code to 2525.			Type on PC "XATC I 5252 2525" The ATC CODE display of the 1400A shall be as specified. Mode C	ID5252
	7.6	2525		Verify the ATC CODE of the Mode C Reply is as specified. Set Mode C code to 5252.			The ATC CODE display of the 1400A shall be as specified. Type on PC "XATC 0000 5252"	2525
	7.7	5252		Verify the ATC CODE of the Mode C Reply is as specified. Interrogate the transponder with Mode S Interrogations			The ATC CODE display of the 1400A shall be as specified. SEQ (Mode S) mode. Mode A	5252
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	8.0			<u>MODE S CODE</u> <u>VERIFICATION, REPLY</u> <u>DELAY AND JITTER</u> Set Mode S Interrogation for alternating 1/0 pattern. Set the transponder to reply to Mode S Interrogations	Test Setup # 1 S1403: S MENU: (1) OFF (2) ON		<u>MODE S CODE</u> <u>VERIFICATION, REPLY</u> <u>DELAY AND JITTER</u> Type on PC "XON AAAAAA"	
	8.1	DF16, Data=2525252 525252525252 525252525 ADD= 52525252		Verify the Mode S Reply to a UF=16 interrogation is correct. Set Mode S Interrogation for the complement alternating 1/0 pattern. Set the transponder to reply to Mode S Interrogations	S1403: S MENU: (2) OFF (3) ON		The reply data on the S-1403 display shall be as specified. Type on PC "XON 555555"	DF16, Data=2525252 525252525252 525252525 ADD= 52525252
	8.2	DF23, Data= 125252525252 525252525252 5252 ADD= 25252525		Verify the Mode S Reply to a UF=23 interrogation is correct. Set Mode S for default interrogation Set the transponder to default state	S1403: S MENU: (3) OFF (1) ON		The reply data on the S-1403 display shall be as specified. Type on PC "XON 1"	DF23, Data= 125252525252 525252525252 5252 ADD= 25252525

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	8.3	127.75 to 128.25 usec (128.0 nominal)		Measure the SPR to First Preamble Pulse Reply Delay on the BOTTOM receiver.			The Rpdly display on the S-1403 shall be as specified.	127.80 to 128.20 usec (128.0 nominal)
	8.4	Less than 0.15 usec		Verify the reply jitter over at least a 10 second interval is within the specified limits.			The absolute value of the difference between the minimum value and maximum value of the Rpdly display on the S1403 over a 10 second period of time shall be as specified.	Less than 0.125 usec
				Interrogate the transponder with ATCRBS Mode A/Mode S Interrogations			ACL (ATCRBS/Mode S All Call) mode	
	8.5	127.50 to 128.50 usec (128.0 nominal)		Measure the Leading edge of P4 to the First Preamble Pulse Reply Delay.		S1403: C MENU: 1 FUNC: 4	The Rpdly display on the S-1403 shall be as specified.	127.60 to 128.40 usec (128.00 nominal)
	8.6	Less than 0.20 usec		Verify the reply jitter over at least a 10 second interval is within the specified limits.			The absolute value of the difference between the minimum value and maximum value of the Rpdly display on the S1403 over a 10 second period of time shall be as specified.	Less than 0.175 usec
				Interrogate the transponder with Mode S Interrogations		S1403: C MENU: 1 FUNC: 2	SEQ (Mode S) mode	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	9.0			<u>RECEIVER MTL, DYNAMIC RANGE AND LOW LEVEL REPLY RATIO</u> Interrogate the transponder with ATCRBS Mode A Interrogations	Test Setup # 1 <u>S1403:</u> C MENU: 1 FUNC: 1		<u>RECEIVER MTL, DYNAMIC RANGE AND LOW LEVEL REPLY RATIO</u> ATC (ATCRBS Only) mode.	
	9.1	-78 to -74 dBm (-76 nom)		Verify the BOTTOM receiver MTL for ATCRBS Mode A Interrogations.			Adjust the RF level until the %Reply:ATC display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
	9.2	Greater than or equal to 90%		Verify the BOTTOM receiver Dynamic range for ATCRBS Mode A interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
	9.3	Less than or equal to 10%		Verify the BOTTOM receiver Low-level reply ratio for ATCRBS Mode A interrogations at -81dBm. Interrogate the transponder with Mode S Interogations	<u>ATC 1400A:</u> RF LEVEL: -81dBm <u>S1403:</u> C MENU: 1 FUNC: 2		The %Reply:ATC on the S1403 display shall be as specified. SEQ (Mode S Only) mode.	Less than or equal to 1%
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5	9.4	-78 to -74 dBm (-76 nom)		Verify the BOTTOM receiver MTL for Mode S Interrogations.			Adjust the RF level until the %Reply:S display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
10	9.5	Greater than or equal to 99%		Verify the BOTTOM receiver Dynamic range for MODE S interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
15				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
20				Interrogate the transponder with ATCRBS Mode C Interrogations	S1403: C MENU: 1 FUNC: 1		ATC (ATCRBS Only) mode.	
25					ATC 1400A: XPDR MODE: C		Mode C	
30	9.6	-78 to -74 dBm (-76 nom)		Verify the TOP receiver MTL for ATCRBS Mode C Interrogations.			Adjust the RF level until the %Reply:ATC display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
35	9.7	Greater than or equal to 90%		Verify the TOP receiver Dynamic range for ATCRBS Mode C interrogations between MTL+3dB and -24dBm.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	9.8	Less than or equal to 10%		Verify the TOP receiver Low-level reply ratio for ATCRBS Mode C interrogations at - 81dBm. Interrogate the transponder with Mode S Interrogations	ATC 1400A: RF LEVEL: - 81dBm ATC 1400A: XPDR MODE: A S1403: C MENU: 1 FUNC: 2		The %Reply:ATC on the S1403 display shall be as specified. Mode A SEQ (Mode S Only) mode.	Less than or equal to 1%
15	9.9	-78 to -74 dBm (-76 nom)		Verify the TOP receiver MTL for Mode S Interrogations.			Adjust the RF level until the %Reply:S display on the S1403 shows 90% average reply. The RF Level display on the 1400A shall be as specified.	-78 to -74 dBm (-76 nom)
25	9.10	Greater than or equal to 99%		Verify the TOP receiver Dynamic range for MODE S interrogations between MTL+3dB and -24dBm. Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Adjust the RF level from -73dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified. Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A	Greater than or equal to 99%

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	10.0			<u>RECEIVER BANDWIDTH</u> Interrogate the transponder with ATCRBS Mode A Interrogations	Test Setup # 1 <u>S1403:</u> C MENU: 1 FUNC: 1 <u>ATC 1400A:</u> RF LEVEL: -16 dBm		<u>RECEIVER BANDWIDTH</u> ATC (ATCRBS Only) mode. RF Level -16dBm	
	10.1	Less than or equal to 90%		Verify the BOTTOM receiver bandwidth response at 1005 MHz to ATCRBS Mode A interrogations	<u>ATC 1400A:</u> FREQ: 1005		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%
	10.2	Less than or equal to 90%		Verify the BOTTOM receiver bandwidth response at 1055 MHz to ATCRBS Mode A interrogations Connect TOP antenna cable to 1400A.	<u>ATC 1400A:</u> FREQ: 1055		The %Reply:ATC on the S1403 display shall be as specified. Connect TOP antenna cable to ATC 1400A.	Less than or equal to 10%
	10.3	Less than or equal to 90%		Verify the TOP receiver bandwidth response at 1055 MHz to ATCRBS Mode A interrogations			The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%
	10.4	Less than or equal to 90%		Verify the TOP receiver bandwidth response at 1005 MHz to ATCRBS Mode A interrogations	<u>ATC 1400A:</u> FREQ: 1005		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 10%

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		OPR LIMITS	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
			Set the RF test set for standard interrogations.	ATC 1400A: FREQ: 1030 RF LEVEL: -73 dBm		Frequency 1030 MHz RF Level -73dBm	
			Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.	S1403: C MENU: 1 FUNC: 2		SEQ (Mode S) Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS		
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.			
				Set the RF test set for Mode S interrogations.	ATC 1400A: RF LEVEL: -67 dBm		RF Level -67 dBm.			
					S1403: C MENU: 1 FUNC: 2		SEQ (Mode S Only) mode.			
	11.5	Less than or equal to 10%		Verify no replies are generated for a Mode S interrogation with the P5 (SLS) pulse set to the P6 RF Level + 3dB	ATC 1400A: SLS/ECHO: +3, ON		The %Reply:S on the S1403 display shall be as specified.	Less than or equal to 5%		
	11.6	Greater than or equal to 99%		Verify replies are generated for a Mode S interrogation with the P5 (SLS) pulse set to the P6 RF Level - 12dB	ATC 1400A: SLS/ECHO: -12, ON		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%		
				Set the RF test set for default interrogations.	ATC 1400A: RF LEVEL: -73 dBm SLS/ECHO: +0, OFF		RF Level -73 dBm.			

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	12.0			<u>P4 PULSE LEVEL,</u> <u>ATCRBS/MODE S AND ATCRBS</u> <u>ONLY ALL CALL</u>	Test Setup # 1		<u>P4 PULSE LEVEL,</u> <u>ATCRBS/MODE S AND</u> <u>ATCRBS ONLY ALL CALL</u>	
				Interrogate the transponder with ATCRBS Mode A/Mode S All Call Interrogations	<u>S1403:</u> C MENU: 1 FUNC: 4 P4: VAR		ACL (ATCRBS/Mode S All Call) mode. P4 level VARIABLE	
	12.1	Greater than or equal to 90%		Verify the BOTTOM receiver recognises interrogations as valid ATCRBS Mode A/Mode S All Call Interrogations when P4 = P3 - 1dB	<u>ATC 1400A</u> SLS/ECHO: -1, OFF		Adjust the RF level from -67dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	12.2	Greater than or equal to 90%		Verify the BOTTOM receiver recognises as a valid ATCRBS Mode A Interrogations when P4 = P3 - 6dB	<u>ATC 1400A</u> SLS/ECHO: -6, OFF		Adjust the RF level from -67dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
				Interrogate the transponder with ATCRBS Mode C-Only All Call Interrogations	<u>S1403:</u> C MENU: 1 FUNC: 3 P4: VAR		ACS (ATCRBS-Only All Call) mode. P4 level VARIABLE	
					<u>ATC 1400A:</u> XPDR MODE: C		ATCRBS Mode C-Only All CALL Interrogations	
	12.3	Less than or equal to 10%		Verify no replies are generated to ATCRBS-Only Mode C All Call interrogations on the BOTTOM receiver when: P4 = P3 - 1dB	<u>ATC 1400A</u> SLS/ECHO: -1, OFF		Adjust the RF level to -67dBm. The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 1%

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Connect TOP antenna cable to 1400A.			Connect TOP antenna cable to ATC 1400A.	
5	12.4	Less than or equal to 10%		Verify no replies are generated to ATCRBS-Only Mode A All Call interrogations on the TOP receiver when: P4 = P3 - 1dB	ATC 1400A XPDR MODE: A		The %Reply:ATC on the S1403 display shall be as specified.	Less than or equal to 1%
10								
15	12.5	Greater than or equal to 90%		Verify the TOP receiver recognises interrogations as valid ATCRBS Mode C/Mode S All Call Interrogations when P4 = P3 - 1dB	ATC 1400A XPDR MODE: C S1403: C MENU: 1 FUNC: 4 P4: VAR		Adjust the RF level from -67dBm to -23dBm in 10dB steps. At each signal level, the %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
20	12.6	Greater than or equal to 90%		Verify the TOP receiver recognises as a valid ATCRBS Mode C Interrogations when P4 = P3 - 6dB	ATC 1400A SLS/ECHO: -6, OFF		Adjust the RF level from -67 dBm to -23dBm in 10dB steps. At each signal level, the %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
25								
30				Set the RF test set for standard interrogations.	ATC 1400A: SLS/ECHO: -0, OFF RF LEVEL: -73 dBm		SLS 0dB, OFF RF Level -73 dBm.	
35					S1403: P4: CAL C MENU: 1 FUNC: 2		P4 Level CAL SEQ (Mode S)	
40				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	13.0			<u>P4 PULSE POSITION</u>	Test Setup # 1		<u>P4 PULSE POSITION</u>	
5					<u>S1403:</u> CMENU: 1 FUNC (4)		ACL (ATCRBS/Mode S All-Call) mode	
10					<u>ATC 1400A:</u> XPDR MODE: C		ATCRBS Mode C/Mode S All CALL Interrogations	
15	13.1	Greater than or equal to 90%		Verify the BOTTOM receiver does NOT recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 1.7 usec. The transponder will reply with ATCRBS replies.	<u>S1403:</u> P4: Dv -0.30		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
20								
25	13.2	Greater than or equal to 90%		Verify the BOTTOM receiver DOES recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 1.95 usec. The transponder will reply with Mode S replies.	<u>S1403:</u> P4: Dv -0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
30								
35	13.3	Greater than or equal to 90%		Verify the BOTTOM receiver DOES recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 2.05 usec. The transponder will reply with Mode S replies.	<u>S1403:</u> P4: Dv +0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	13.4	Greater than or equal to 90%		Verify the BOTTOM receiver does NOT recognise interrogations as ATCRBS Mode C/Mode S All Call when the P3 to P4 spacing is 2.3 usec. The transponder will reply with ATCRBS replies. Connect TOP antenna cable to 1400A.	<u>S1403:</u> P4: Dv +0.30		The %Reply:ATC on the S1403 display shall be as specified. Connect TOP antenna cable to ATC 1400A.	Greater than or equal to 99%
	13.5	Greater than or equal to 90%		Verify the TOP receiver does NOT recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 1.7 usec. The transponder will reply with ATCRBS replies.	<u>S1403:</u> P4: Dv -0.30 <u>ATC 1400A:</u> XPDR MODE: A		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%
	13.6	Greater than or equal to 90%		Verify the TOP receiver DOES recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 1.95 usec. The transponder will reply with Mode S replies.	<u>S1403:</u> P4: Dv -0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS			
5	13.7	Greater than or equal to 90%		Verify the TOP receiver DOES recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 2.05 usec. The transponder will reply with Mode S replies.	S1403: P4: Dv +0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%			
10	13.8	Greater than or equal to 90%		Verify the TOP receiver does NOT recognise interrogations as ATCRBS Mode A/Mode S All Call when the P3 to P4 spacing is 2.3 usec. The transponder will reply with ATCRBS replies.	S1403: P4: Dv +0.30		The %Reply:ATC on the S1403 display shall be as specified.	Greater than or equal to 99%			
15									Set the RF test set for standard interrogations.	S1403: P4: Dv CAL	P4 Deviation: CAL
20											
25			Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.			Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.					
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	14.0			<u>MODE S SYNC PHASE REVERSAL (SPR) POSITION</u>	Test Setup #1		<u>MODE S SYNC PHASE REVERSAL (SPR) POSITION</u>	
	14.1	Less than or equal to 1%		Verify no reply is generated when the P6 to SPR delay on the BOTTOM receiver is 1.05 usec.	<u>S1403:</u> C MENU: 1 SPR Dv: -0.20		The %Reply:S on the S1403 display shall be as specified.	Less than or equal to 1%
	14.2	Greater than or equal to 99%		Verify replies are generated when the P6 to SPR delay on the BOTTOM receiver is 1.20 usec.	<u>S1403:</u> SPR Dv: -0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	14.3	Greater than or equal to 99%		Verify replies are generated when the P6 to SPR delay on the BOTTOM receiver is 1.30 usec.	<u>S1403:</u> SPR Dv: +0.05		The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%
	14.4	Less than or equal to 1%		Verify no reply is generated when the P6 to SPR delay on the BOTTOM receiver is 1.45 usec.	<u>S1403:</u> SPR Dv: +0.20		The %Reply:S on the S1403 display shall be as specified.	Less than or equal to 1%
				Set the RF test set for standard interrogations.	<u>S1403:</u> SPR Dv: CAL		SPR Deviation: CAL	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	15.0			<u>DIVERSITY OPERATION</u> Interrogate the unit with a Mode S interrogation on the TOP and BOTTOM antenna.	Test Setup #1		<u>DIVERSITY OPERATION</u> <u>NOTE:</u> The TOP and BOTTOM antenna cables shall be matched per the requirement in paragraph 3.5.	
	15.1	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -47dBm DELAY: TOP 125nsec BEFORE BOT Verify transponder replies on the BOTTOM channel.	<u>S1403:</u> CMENU: 1 FUNC: 2 RF Lvl: +0.0 ANT B: -.15 <u>ATC1400A:</u> RF LEVEL: -47		The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%
	15.2	Greater than or equal to 90%		Interrogate the transponder with: ATCRBS Mode A Interrogations. TOP RF Level: -50dBm BOT RF Level: -47dBm DELAY: TOP 125nsec BEFORE BOT Verify transponder replies on the BOTTOM channel.	<u>S1403:</u> CMENU: 1 FUNC: 1		The %Reply:ATC display on the S1403 shall be as specified.	Greater than or equal to 99%
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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS	
	15.3	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -53dBm DELAY: TOP 125nsec BEFORE BOT. Verify transponder replies on the TOP channel.	<u>S1403:</u> CMENU: 1 FUNC: 2 <u>ATC1400A:</u> RF LEVEL: -53		The %Reply:AntB display on the S1403 shall be as specified.	Greater than or equal to 99%	
	15.4	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -53dBm DELAY: TOP 125nsec AFTER BOT. Verify transponder replies on the TOP channel.	<u>S1403:</u> CMENU: 1 ANT B: +.15		The %Reply:AntB display on the S1403 shall be as specified.	Greater than or equal to 99%	
	15.5	Greater than or equal to 90%		Interrogate the transponder with: ATCRBS Mode A Interrogations TOP RF Level: -50dBm BOT RF Level: -53dBm DELAY: TOP 125nsec AFTER BOT. Verify transponder replies on the TOP channel.	<u>S1403:</u> CMENU: 1 FUNC: 1		The %Reply:AntB display on the S1403 shall be as specified.	Greater than or equal to 99%	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	15.6	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: -47dBm DELAY: TOP 125nsec AFTER BOT. Verify transponder replies on the BOTTOM channel.	<u>S1403:</u> CMENU: 1 FUNC: 2 <u>ATC1400A:</u> RF LEVEL: -47		The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%
	15.7	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: -50dBm BOT RF Level: MTL+3dB DELAY: TOP 375nsec AFTER BOT Verify transponder replies on the BOTTOM channel. Connect TOP antenna cable to ATC 1400A and BOTTOM antenna cable to S1403.	<u>S1403:</u> CMENU: 1 RF Lvl: +CABLE LOSS ANT B: .35 <u>ATC1400A:</u> RF LEVEL: -73		The %Reply:S display on the S1403 shall be as specified. Connect TOP antenna cable to ATC 1400A and BOTTOM antenna cable to S1403.	Greater than or equal to 99%
	15.8	Greater than or equal to 90%		Interrogate the transponder with: Mode S Interrogations TOP RF Level: MTL+3dB BOT RF Level: -50dBm DELAY: TOP 375nsec BEFORE BOT Verify transponder replies on the TOP channel.			The %Reply:S display on the S1403 shall be as specified.	Greater than or equal to 99%

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Set the RF test set for standard interrogations.	<u>S1403:</u> ANT B: OFF		ANT B OFF	
				Re-connect BOTTOM antenna cable to 1400A ant TOP antenna cable to S1403.	<u>ATC1400A:</u> RF LEVEL: -73		Connect TOP antenna cable to S1403 and BOTTOM antenna cable to ATC 1400A.	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Exit COMM-D simulator Enter PROCOMM Set the RF Generator for internal modulation.			Type "<ESC>" on PC Type "PCPLUS" on PC Type "<RET>" after PROCOMM is running.	
					S1403: CMENU: 2 Ext Mod In: OFF ATC1400A: RF LEVEL: -73			

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		OPR LIMITS		TEST DESCRIPTION		SWITCH POS		MFG LIMITS		
		17.0		<u>MUTUAL SUPPRESSION</u>		Test setup #1		<u>MUTUAL SUPPRESSION</u>		
M	17.1	21.0 to 31.0 V (26.0 nominal)		Verify mutual suppression line goes active when replying to Mode S interrogations.				Monitor Suppression Pulse #2 with an oscilloscope. The amplitude of the mutual suppression pulse shall be as specified.	21.0 to 31.0 V (26.0 nominal)	
	17.2	110 to 135 usec (123 nominal)		Verify the duration of the mutual suppression pulse.				The pulse width (50% to 50% voltage point) of the mutual suppression pulse shall be as specified.	110 to 135 usec (123 nominal)	
	17.3	Equal to 0%		Externally activate the mutual suppression line with a pulse amplitude of 18.0V. Verify no replies are generated.	ATC 1400A: INTF PULSE: INTRF+, 000.0 SUPP- RESSOR: ON			The %Reply:S on the S1403 display shall be as specified.	Equal to 0%	
				Disconnect mutual suppression output.	ATC 1400A: INTF PULSE: OFF, 000.0 SUPP- RESSOR:OFF			Disconnect the ATC 1400A suppression output from Suppression bus #2		
	17.4	Greater than or equal to 99%		Verify the transponder replies to Mode S interrogations.				The %Reply:S on the S1403 display shall be as specified.	Greater than or equal to 99%	

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		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	18.0			<u>DISCRETE INPUTS</u> Set all switches on alternating OPEN(0)/GROUND(1) patterns to the discrete input port for INPUT PORT 0 thru INPUT PORT 4 Display discrete input ports	Test Setup #1		<u>DISCRETE INPUTS</u> Set all switches on the MTS Interface panel and MTS Adapter panel to the positions in Table #7-1. Type on PC "DIN"	
15	18.1	AAAA AAAA AAAA AAAA EAAA		Verify the input ports are reading the correct discrete status.			The first 5 words of data on the PC screen shall be as specified. (The 6th word is not used).	AAAA AAAA AAAA AAAA EAAA
20	18.2	AAAA AAAA AAAA AAAA AAAA		Verify the front panel test switch is operational. Complement the setting of all switches to the discrete input port for INPUT PORT 0 thru INPUT PORT 4			Depress the front panel test switch. The first 5 words of data on the PC screen shall be as specified. Set all switches on the test set to the positions in table 2.	AAAA AAAA AAAA AAAA AAAA
35	18.3	5555 5555 5555 5555 D555		Verify the input ports are reading the correct discrete status. Set the switches back to default settings.			The first 5 words of data on the PC screen shall be as specified. (The 6th word is not used). Set all switches on the test set to the position in table 1.	5555 5555 5555 5555 D555
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	19.0			<u>DISCRETE OUTPUTS AND LEDS</u> Set Discrete outputs to the "ON" state.	Test Setup #1		<u>DISCRETE OUTPUTS AND LEDS</u> Type on PC "DOUT 11111"		
	19.1	ON ON ON ON		Verify each of the discrete outputs are on.			The 4 LEDs on the MTS panel shall be as specified. XPDR FAIL 1, 2 ALT FAIL 1, 2	ON ON ON ON	
	19.2	0111		Verify the over-current monitors for each of the discrete outputs are in the normal mode.			The first 4 digits of the display on the PC screen shall be as specified. (The number after the first 4 digits is not used.)	0111	
				Set Discrete outputs to the "OFF" state.			Type on PC "<ESC>" "DOUT 00000"		
	19.3	OFF OFF OFF OFF		Verify each of the discrete outputs are off.			The 4 LEDs on the MTS panel shall be as specified. XPDR FAIL 1, 2 ALT FAIL 1, 2	OFF OFF OFF OFF	
	19.4	0111		Verify the over-current monitors for each of the discrete outputs are in the normal mode.			The first 4 digits of the display on the PC screen shall be as specified. (The number after the first 4 digits is not used.)	0111	
	19.5	PASS		Verify each of the front panel LED lights work.			The 6 LEDs on the unit front panel shall alternate ON and OFF at approximately a 1 second rate.	PASS	
				Set unit to default mode			Type on PC "<ESC>"		

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REV LTR	TEST NO.	SPECIFICATION		PROCEDURE		SPECIFICATION		
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	20.0			<u>ADDITIONAL INTERFACES</u> <u>(-55xxx to -99xxx ONLY)</u> Connect a DVM across the FAN outputs. Set Discrete outputs to the "ON" state.	Test Setup #1		<u>ADDITIONAL INTERFACES</u> <u>(-55xxx to -99xxx</u> <u>ONLY)</u> Connect DVM with (+) input to FAN +28V and (-) input to FAN RETURN(NO) on MTS test set. Type on PC "DOUT 11111"	
	20.1	Greater than 22Vdc		Measure the voltage across the FAN outputs with the FAN RETURN(NO) output on.			The voltage on the DVM shall be as specified.	Greater than 22Vdc
	20.2	Less than 1.5 Vdc		Verify the over-current monitor for the fan is in the ON state. Set Discrete outputs to the "OFF" state.			The last number of the display (in Vdc) on the PC screen shall be as specified. (The first 4 digit number is not used.) Type on PC "DOUT 00000"	Less than 1.5 Vdc
	20.3	Less than 0.1Vdc		Measure the voltage across the FAN outputs with the FAN RETURN(NO) output off.			The voltage on the DVM shall be as specified.	Less than 0.1 Vdc
	20.4	Greater than 3.0 Vdc		Verify the over-current monitor for the fan is in the OFF state.			The last number of the display (in Vdc) on the PC screen shall be as specified. (The first 4 digit number is not used.)	Greater than 3.0 Vdc

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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
				Ground the XPDR OFF(NO) discrete output to turn the unit OFF.			Set the XPDR OFF(NO) switch to the up position.	
5	20.5	Less than 0.1A		Measure the input current to the unit to verify that the unit is off.			The power supply input current to the unit shall be as specified.	Less than 0.1A
10				Remove ground from the XPDR OFF(NO) discrete output to turn the unit ON.			Set the XPDR OFF(NO) switch to the down position.	
15				Set unit to default mode			Type on PC "<ESC>" "XON 1"	
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REV LTR	TEST NO.	SPECIFICATION		PROCEDURE		SPECIFICATION		
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
	21.7	359.0 to 1.0 Degrees		Verify the Course #2 synchro angle is within specification.			The Syn2 CA angle display on the PC screen shall be as specified.	359.0 to 1.0 Degrees
	21.8	359.0 to 1.0 Degrees		Verify the Fine #2 synchro angle is within specification.			The Syn2 FA angle display on the PC screen shall be as specified.	359.0 to 1.0 Degrees
				Change the polarity of the synchro reference input to the default setting.	MTS Panel 26VAC POL = +		Type on PC * <u><ESC></u> *	
				Set unit to default mode				

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REV LTR	TEST NO.	SPECIFICATION		PROCEDURE		SPECIFICATION	
		OPR LIMITS	C TEST DESCRIPTION	SWITCH POS	C WORK STEPS	MFG LIMITS	
	21.0		SYNCHRO ALTITUDE INTERFACES (Steps 21.1 through 21.8 for -10xxx to -19xxx and -55xxx to -64xxx)	Test Setup #1		SYNCHRO ALTITUDE INTERFACES (Steps 21.1 through 21.8 for -10xxx to -19xxx and -55xxx to -64xxx)	
	21.1	179.0 to 181.0 Degrees	Monitor the output of the synchro circuit. Verify the Course #1 synchro angle is within specification.			Type on PC "MON" The Syn1 CA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
	21.2	179.0 to 181.0 Degrees	Verify the Fine #1 synchro angle is within specification.			The Syn1 FA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
	21.3	179.0 to 181.0 Degrees	Verify the Course #2 synchro angle is within specification.			The Syn2 CA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
	21.4	179.0 to 181.0 Degrees	Verify the Fine #2 synchro angle is within specification.			The Syn2 FA angle display on the PC screen shall be as specified.	179.0 to 181.0 Degrees
			Change the polarity of the synchro reference input.	MTS Panel 26VAC POL			
	21.5	359.0 to 1.0 Degrees	Verify the Course #1 synchro angle is within specification.			The Syn1 CA angle display on the PC screen shall be as specified.	359.0 to 1.0 Degrees
	21.6	359.0 to 1.0 Degrees	Verify the Fine #1 synchro angle is within specification.			The Syn1 FA angle display on the PC screen shall be as specified.	359.0 to 1.0 Degrees



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REV TR	TEST NO.	SPECIFICATION			PROCEDURE		SPECIFICATION
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	MFG LIMITS
5	21.9	11.5 VDC to 13.7 VDC		(Steps 21.9 through 21.22 for -20xxx and -65xxx) Connect 4.99Kohm resistor between ARINC 600 BP2 and GROUND			11.5 VDC to 13.7 VDC
10				Verify the DC voltage between ARINC 600 BP2 and GROUND			
15				Remove 4.99Kohm resistor between ARINC 600 BP2 and GROUND			
20		11.5 VDC to 13.7 VDC		Connect 4.99 Kohm resistor between ARINC 600 BP5 and GROUND			11.5 VDC to 13.7 VDC
25	21.10			Verify the DC voltage between ARINC 600 BP5 and GROUND			
30				Remove 4.99Kohm resistor between ARINC 600 BP5 and GROUND			
35				Connect SYNCRO ALT #1 CX, SYNCRO ALT #1 CY, SYNCRO ALT #2 CX, and SYNCRO ALT #2 CY together			
40				Connect SYNCRO ALT #1 CZ, SYNCRO ALT #2 CZ, and GROUND together			
45							

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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION	
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS	
				Apply 12.00 ± 0.05 VDC between SYNCRO ALT #1 CX and GROUND			On the MTS, apply 12.00 ± 0.05 VDC between SYNC ALT 1/2 CX and GROUND		
				Monitor the output of the analog altimeter circuit			Type on PC		
							"MON"		
5	21.11	6.500 to 6.650 Volts		Verify the SYNCRO ALT #1 CX voltage is within specification			The SYN1 CX voltage on the PC screen shall be as specified	6.500 to 6.650 Volts	
10	21.12	6.500 to 6.650 Volts		Verify the SYNCRO ALT #1 CY voltage is within specification			The SYN1 CY voltage on the PC screen shall be as specified	6.500 to 6.650 Volts	
15	21.13	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #1 CX voltage and the SYNCRO ALT #1 CY voltage is within specification			The difference between the SYN1 CX and the SYN1 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts	
20	21.14	6.500 to 6.650 Volts		Verify the SYNCRO ALT #2 CX voltage is within specification			The SYN2 CX voltage on the PC screen shall be as specified	6.500 to 6.650 Volts	
25	21.15	6.500 to 6.650 Volts		Verify the SYNCRO ALT #2 CY voltage is within specification			The SYN2 CY voltage on the PC screen shall be as specified	6.500 to 6.650 Volts	
30	21.16	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #2 CX voltage and the SYNCRO ALT #2 CY voltage is within specification			The difference between the SYN2 CX and the SYN2 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts	
35				Apply 6.00 ± 0.05 VDC between SYNCRO ALT #1 and GROUND			On the MTS, apply 6.00 ± 0.05 VDC between SYNC ALT 1/2 CX and GROUND		
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45									

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REV LTR	TEST NO.	SPECIFICATION			PROCEDURE			SPECIFICATION	
		OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS	
	21.17	3.250 to 3.350 Volts		Verify the SYNCRO ALT #1 CX voltage is within specification			The SYN1 CX voltage on the PC screen shall be as specified	3.250 to 3.350 Volts	
	21.18	3.250 to 3.350 Volts		Verify the SYNCRO ALT #1 CY voltage is within specification			The SYN1 CY voltage on the PC screen shall be as specified	3.250 to 3.350 Volts	
	21.19	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #1 CX voltage and the SYNCRO ALT #1 CY voltage is within specification			The difference between the SYN1 CX and the SYN1 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts	
	21.20	3.250 to 3.350 Volts		Verify the SYNCRO ALT #2 CX voltage is within specification			The SYN2 CX voltage on the PC screen shall be as specified	3.250 to 3.350 Volts	
	21.21	3.250 to 3.350 Volts		Verify the SYNCRO ALT #2 CY voltage is within specification			The SYN2 CY voltage on the PC screen shall be as specified	3.250 to 3.350 Volts	
	21.22	-0.010 to +0.010 Volts		Verify the difference between the SYNCRO ALT #2 CX voltage and the SYNCRO ALT #2 CY voltage is within specification			The difference between the SYN2 CX and the SYN2 CY voltage on the PC screen shall be as specified	-0.010 to +0.010 Volts	

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REV LTR		TEST NO.	SPECIFICATION		PROCEDURE		SPECIFICATION		
			OPR LIMITS	C	TEST DESCRIPTION	SWITCH POS	C	WORK STEPS	MFG LIMITS
L		22.0			ARINC 429 BUS INTERFACES	Test Setup #1		ARINC 429 BUS INTERFACES	
	5				Set the unit to generate internal ARINC 429 loop-back tests.	Type on the PC: "AS"			
L		22.1	00000000 00000000 00000000 00000000 0000 0000		Verify that no internal ARINC 429 errors occur.			The 6 words on the PC display shall be as specified.	00000000 00000000 00000000 00000000 0000 0000
	10								
	15				Connect ARINC 429 Test signal (transmitter) output to ARINC 429 Receiver Inputs.			Connect the ARINC 429 Test signal (transmitter) output to the requirements in table 5.	
	20				Apply ARINC 429 signal to COM A/B In From ADLP bus (P1A-2A/2B).			Type on the PC: "<ESC>" "AR 0 H"	
L	25	22.2	2AAAAAAA 0000		Verify the data words were received without errors.			The two data words on the PC display shall be as specified.	2AAAAAAA 0000
	30				Apply ARINC 429 signal to COM C/D In From ADLP bus (P1A-2C/2D).			Type on the PC: "<ESC>" "AR 1 H"	
L		22.3	2AAAAAAA 0000		Verify the data words were received without errors.			The two data words on the PC display shall be as specified.	2AAAAAAA 0000
	35				Apply ARINC 429 signal to TX Coordination Bus (P1A-5E/5F).			Type on the PC: "<ESC>" "AR 2 H"	
	40								
L		22.4	2AAAAAAA 0000		Verify the data words were received without errors.			The two data words on the PC display shall be as specified.	2AAAAAAA 0000
	45				Apply ARINC 429 signal to Flight ID Input Bus (P1A-6A/6B).			Type on the PC: "<ESC>" "AR 3 H"	

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