2. Calibration/Verification

A. General

(1) Calibration/Verification Schedule

The Calibration/Verification Procedures should be performed as a result of one or more of the following conditions:

- Failure to Meet Specifications

  If, during the course of normal operation, the ATC-1400A-2 or any major function thereof fails to meet the performance specifications according to Appendix I, Calibration/Verification Procedures should be performed.

- Assembly Replacement

  If one or more ATC-1400A-2 assemblies are replaced, Calibration/Verification Procedures should be performed according to 2-2-2, Table 47.

- Annual Calibration/Verification

  IFR recommends an annual Calibration/Verification on the ATC-1400A-2 to maintain proper testing standards.

(2) Controls, Connectors and Indicators

Refer to Appendix J, Figure 1 to locate controls, connectors and indicators on the ATC-1400A-2 Front Panel. Refer to Appendix J, Figure 2 to locate controls, connectors and indicators on the ATC-1400A-2 Rear Panel.

(3) Test Record

A Calibration/Verification Data Sheet is provided for recording results obtained while performing the Calibration/Verification Procedures.

NOTE: It is recommended the technician reproduce copies of the Calibration/ Verification Data Sheet rather than use the copy in this manual.

B. Precautions

(1) Safety

WARNING: REMOVE ALL JEWELRY OR OTHER COSMETIC APPAREL BEFORE PERFORMING ANY CALIBRATION/VERIFICATION PROCEDURE INVOLVING LIVE CIRCUITS.

WARNING: WHEN WORKING WITH LIVE CIRCUITS OF HIGH POTENTIAL, KEEP ONE HAND IN POCKET OR BEHIND BACK TO AVOID SERIOUS SHOCK HAZARD.

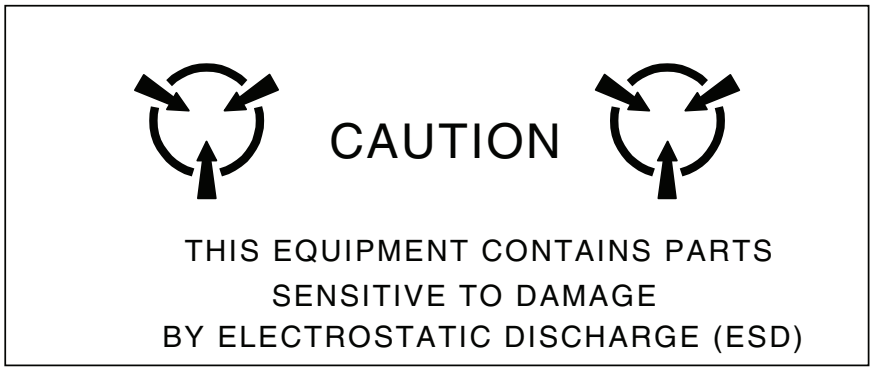
WARNING: USE ONLY INSULATED TROUBLESHOOTING TOOLS WHEN WORKING WITH LIVE CIRCUITS.

WARNING: FOR ADDED INSULATION, PLACE RUBBER BENCH MAT UNDERNEATH ALL POWERED BENCH EQUIPMENT, AS WELL AS RUBBER MAT UNDERNEATH TECHNICIAN'S CHAIR.

WARNING: HEED ALL WARNINGS AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.

(2) ESD

CAUTION: THE POWER SUPPLY ASSY, DIGITAL IF PCB ASSY, FRONT PANEL PULSE PCB ASSY, RF ASSY AND FRONT PANEL ASSY CONTAIN PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING CALIBRATION PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED.



(3) EMC and Safety Compliance

All assemblies, cables, connectors, plastic fasteners, gaskets, fingerstock and miscellaneous hardware within the Test Set are configured to satisfy the safety and EMC compliance standards.

CAUTION: UPON COMPLETION OF ANY MAINTENANCE ACTION; ALL ASSEMBLIES, CABLES, CONNECTORS, PLASTIC FASTENERS, GASKETS, FINGERSTOCK AND MISCELLANEOUS HARDWARE MUST BE CONFIGURED AS INSTALLED AT THE FACTORY.

C. Requirements

(1) Test Equipment

Appendix G contains a list of test equipment suitable for performing any procedure in this manual. Any other equipment meeting the specifications of equipment listed in Appendix G may be substituted in place of the recommended models.

NOTE: For certain procedures, equipment listed in Appendix G may exceed the minimum required specifications.

(2) Disassembly

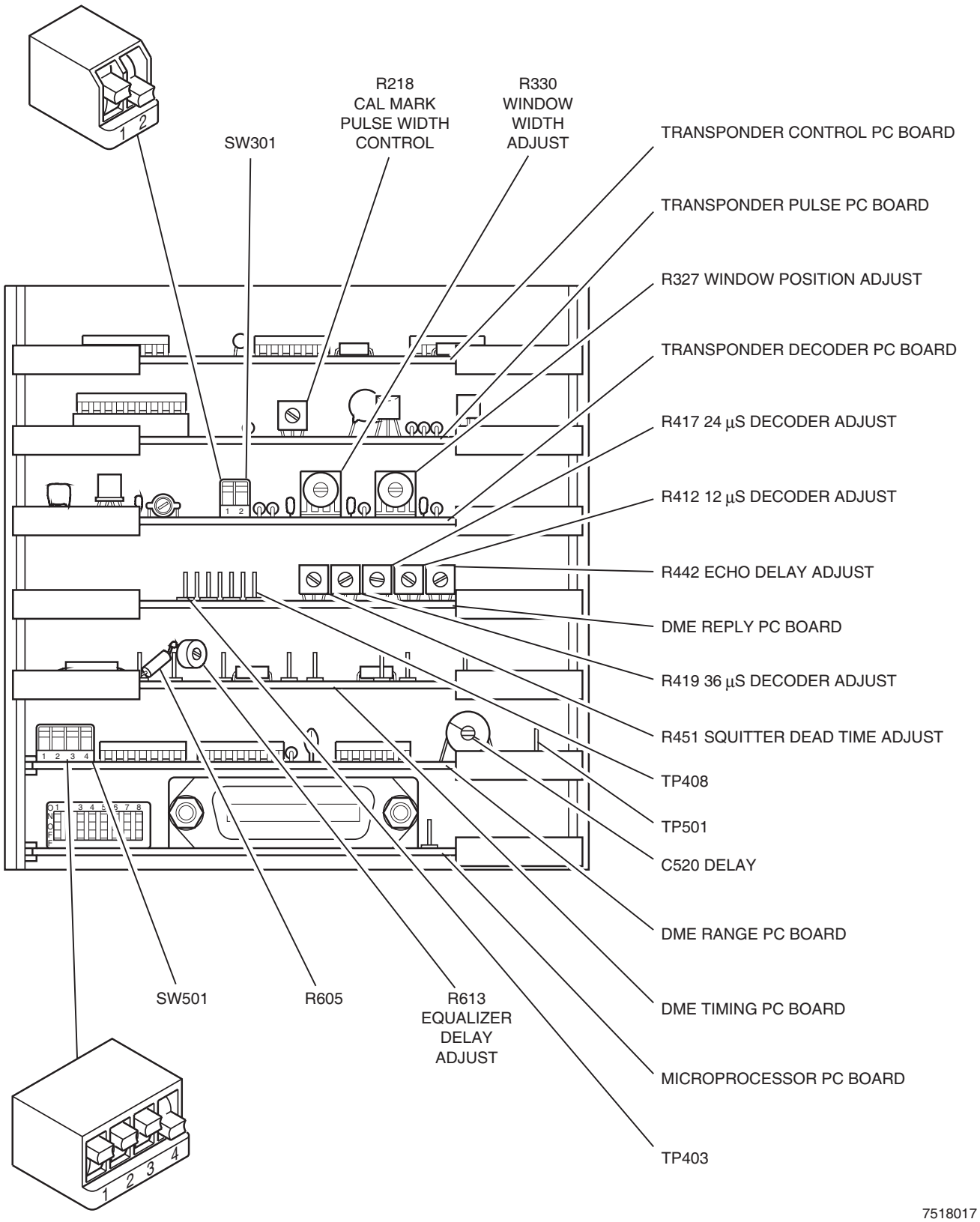
Remove the top cover from the ATC-1400A-2 according to the disassembly procedure in 2-3-1D(1)(a). Remove the Card Cage Assembly cover according to the disassembly procedure in 2-3-1D(14)(a).

(3) Environment

For best results, the calibration/verification environmental conditions should be identical to the environmental conditions at the normal operating location.

(4) Tools

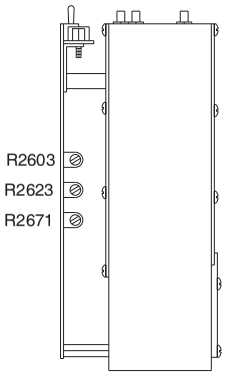
Adjustments require a non-conductive adjustment tool up to four inches (≈ten centimeters) in length.



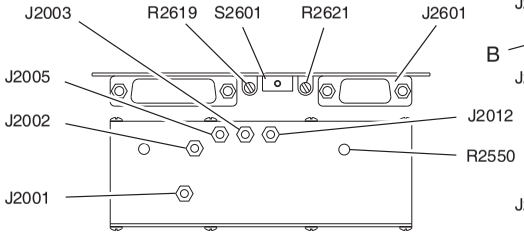
Rear Panel Card Cage Assembly View
Figure 25

If this assembly is repaired or replaced, / the following Calibration Procedures must be performed.	Power Supply	Counter Time Base	Cal Marks	RF Frequency Check and Level	TACAN AM	SLS Level	XPDR/DME Pulse Spacing and Shaping	XPDR/DME Window Width and Positioning	X and Y Channel Range and R-NAV Delay	50% Video Slicer and Transmitter Power	Discriminator Frequency	Parameter Verifications
Front Panel Assembly												
Microprocessor PC Board Assembly												
DME Range PC Board Assembly									●			
DME Reply PC Board Assembly								●	●			
DME Timing PC Board Assembly									●			
XPDR Control PC Board Assembly												
XPDR Decoder PC Board Assembly			●					●	●			
XPDR Pulse PC Board Assembly			●									
Motherboard PC Board Assembly				●	●							
200 MHz Generator Assembly				●	●	●	●		●			
ALC/Mixer Assembly				●	●	●						
RF Synthesizer Assembly				●								
Discriminator Assembly										●	●	
Counter Assembly		●										
Video Assembly										●	●	
RF Bulkhead Assembly				●	●	●				●	●	
Power Supply Assembly	●	●	●	●	●	●	●	●	●	●	●	●
Interface PC Board Assembly									●			
Rear Panel Assembly												

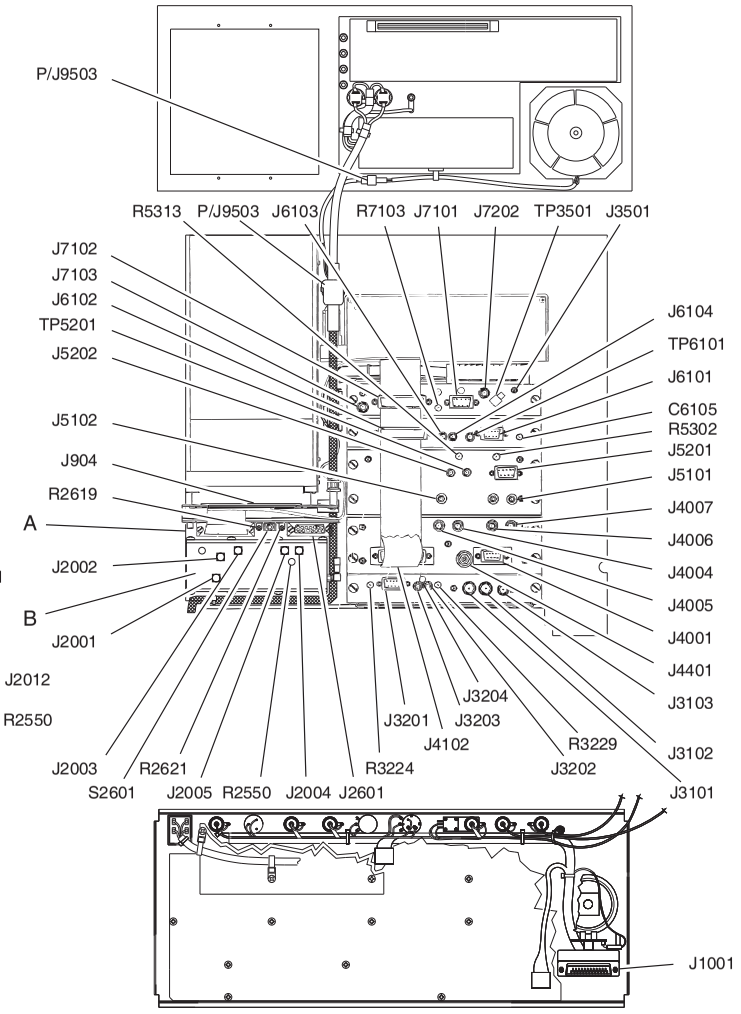
Assembly Replacement Requirements
Table 47

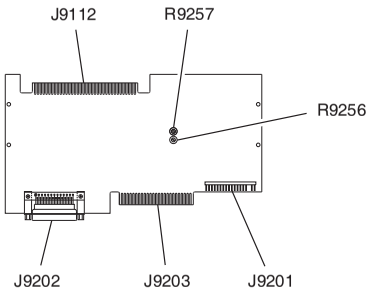


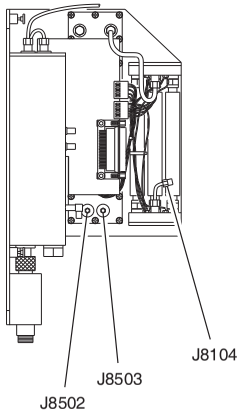
DETAIL A



DETAIL B
(WITH SLS MOD)







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Location of Calibration Adjustments and Test Points
Figure 26

D. Calibration/Verification Procedures

(1) Power Supply

PREREQUISITES: None

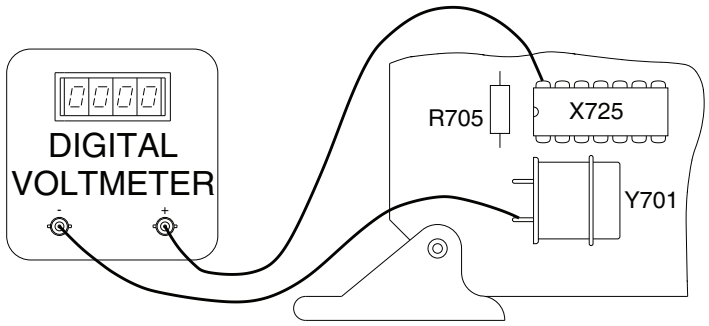
TEST EQUIPMENT: 1 Digital Multimeter

SET-UP DIAGRAM: None

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP	PROCEDURE

1. Verify on SW301 (XPDR Decoder PC Board Assembly), dip switch #1 is set to ***UP*** and dip switch #2 is set to ***DOWN*** (2-2-2, Figure 25).
2. Verify on SW501 (DME Range PC Board Assembly), dip switch #1, #2 and #3 are set to ***UP*** and dip switch #4 is set to ***DOWN*** (2-2-2, Figure 25).
3. Remove Microprocessor PC Board Assembly (2-2-2, Figure 25) part way out from Card Cage Assembly and connect Digital Multimeter positive lead to X725, pin 14 and negative lead to ground (2-2-2, Figure 27).



Microprocessor PC Board Assembly Detail
Figure 27

4. Reinstall Microprocessor PC Board Assembly in Card Cage Assembly.
5. Set ATC-1400A-2 POWER Switch to ***ON***. Verify ATC-1400A-2 front panel displays are in accordance with power-up self test in 2-2-4, Table 55.
6. Allow a 10 minute warm-up period before proceeding.

STEP PROCEDURE

7. Verify voltage displayed on Digital Multimeter is 4.9 Vdc (±0.05 V). If not, adjust R9932 as follows:

   WARNING: THE FRONT AND REAR PANEL ASSEMBLIES CARRY 120 OR 240 VAC POTENTIAL WHEN THE POWER CORD IS CONNECTED TO THE ATC-1400A-2 AND EXTERNAL AC POWER SOURCE. DO NOT CONTACT THESE OR ANY ASSOCIATED COMPONENTS DURING CALIBRATION.

   - Set ATC-1400A-2 POWER Switch to ***OFF***.
   - Disconnect ac power cord from AC INPUT Connector.
   - Remove the bottom cover from the ATC-1400A-2 according to the disassembly procedure in 2-3-1D(1)(a).
   - Reconnect ac power cord to AC INPUT Connector.
   - Set ATC-1400-2A POWER Switch to ***ON***.
   - Adjust R9932 (+5 V Adjustment) through the small adjustment hole on the underside of the ATC-1400A-2 (directly underneath the Power Supply Assembly), as needed for 4.9 Vdc (±0.05 V).

8. Set ATC-1400A-2 POWER Switch to ***OFF***.

9 Remove Microprocessor PC Board Assembly (2-2-2, Figure 25) part way out of Card Cage Assembly. Disconnect Digital Multimeter leads.

10. Reinstall Microprocessor PC Board Assembly in Card Cage Assembly.

11. Set POWER Switch to ***ON***. Verify ATC-1400A-2 front panel displays are in accordance with power-up self test in 2-2-4, Table 55.

12. Connect Digital Multimeter positive lead to P/J7101, pin 1 and negative lead to P/J7101, pin 2. Refer to J7101 (2-2-2, Figure 26) on Video Assembly.

STEP PROCEDURE

13. Verify voltage displayed on Digital Multimeter is 5 Vdc (±0.25 Vdc). If voltage exceeds 5.25 V, adjust R9932 as follows:

    WARNING: THE FRONT AND REAR PANEL ASSEMBLIES CARRY 120 OR 240 VAC POTENTIAL WHEN THE POWER CORD IS CONNECTED TO THE ATC-1400A-2 AND EXTERNAL AC POWER SOURCE. DO NOT CONTACT THESE OR ANY ASSOCIATED COMPONENTS DURING CALIBRATION.

    - Set ATC-1400A-2 POWER Switch to ***OFF***.
    - Disconnect ac power cord from AC INPUT Connector.
    - Remove the bottom cover from the ATC-1400A-2 according to the disassembly procedure in 2-3-1D(1)(a).
    - Reconnect ac power cord to AC INPUT Connector.
    - Set ATC-1400A-2 POWER Switch to ***ON***.
    - Adjust R9932 (+5 V Adjustment) through the small adjustment hole on the underside of the ATC-1400A-2 (directly underneath the Power Supply Assembly), as needed to set voltage ≤±5.25 Vdc.
    - Set ATC-1400A-2 POWER Switch to ***OFF***.
    - Repeat Steps 3 through 13 until Microprocessor PC Board Assembly voltage is 4.9 Vdc (±0.05 V) and Video Assembly voltage is ≤5.25 Vdc.

14. Disconnect Digital Multimeter positive lead from P/J7101, pin 1. Connect Digital Multimeter positive lead to P/J7101, pin 3. Refer to J7101 (2-2-2, Figure 26) on Video Assembly. Verify +12 Vdc (±0.2 V) is displayed on Digital Multimeter.

15. Disconnect Digital Multimeter positive lead from P/J7101, pin 3. Connect Digital Multimeter positive lead to P/J7101, pin 5. Refer to J7101 (2-2-2, Figure 26) on Video Assembly. Verify -12 Vdc (±0.5 V) is displayed on Digital Multimeter.

16. Disconnect Digital Multimeter positive lead from P/J7101, pin 5. Connect Digital Multimeter positive lead to P/J7101, pin 6. Refer to J7101 (2-2-2, Figure 26) on Video Assembly. Verify -5 Vdc (±0.2 V) is displayed on Digital Multimeter.

17. Set POWER Switch to ***OFF***.

18. Disconnect test equipment.

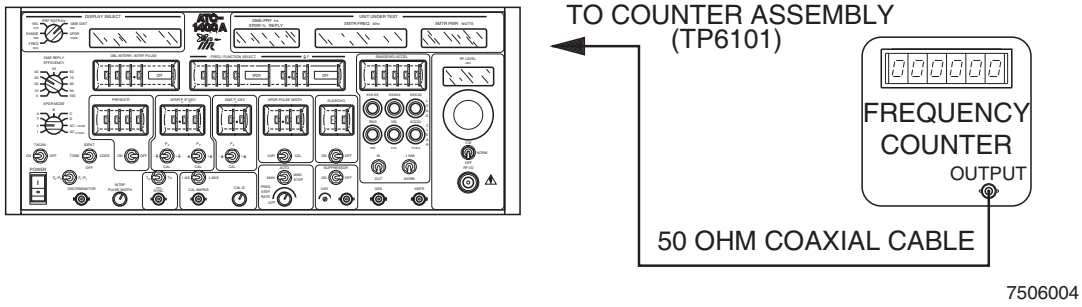
19. Reinstall all assemblies.

(2) Counter Time Base

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT: 1 Frequency Counter
1 50 Ω Coaxial Cable (BNC to SMB)

SET-UP DIAGRAM:



Counter Time Base Calibration Test Setup Diagram
Figure 28

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP	PROCEDURE

1. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 28.
2. Set ATC-1400A-2 POWER Switch to ***ON***. Verify ATC-1400A-2 front panel displays are in accordance with power-up self test in 2-2-4, Table 55.
3. Allow a 10 minute warm-up period.
4. Verify frequency displayed on Frequency Counter is 5 MHz (±3 Hz). Adjust C6105 (Counter Assembly) (2-2-2, Figure 26) as needed for proper frequency.
5. Set POWER Switch to ***OFF***.
6. Disconnect test equipment.

(3) CAL MARKS

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT: 1 Frequency Counter
2 50 Ω Coaxial Cables (BNC to BNC)

SET-UP DIAGRAM: None

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CAL Ø Control	***CCW***
1.0 µs/1.45 µs Switch	***1.45 µs***
PRF/SQTR ON/OFF Switch	***OFF***
PRF/SQTR Thumbwheels	***0000***
FREQ/FUNCTION SELECT Thumbwheels	***1000 XPDR***

2. Connect Frequency Counter to CAL MARKS Connector (J19).
3. Set POWER Switch to ***ON***. Allow a 10 minute warm-up period.
4. Verify frequency displayed on Frequency Counter is 689655 Hz (±34 Hz).
5. Set CAL MARKS Switch to ***1.0 µs***.
6. Verify frequency displayed on Frequency Counter is 1 MHz (±50 Hz).
7. Remove Frequency Counter from CAL MARKS Connector (J19). Connect Oscilloscope to CAL MARKS Connector (J19). Set 1.0 µs/1.45 µs Switch to ***1.45 µs***.
8. Verify pulse width displayed on Oscilloscope is 0.45 µs at 50% point. Adjust R218 (XPDR Pulse PC Board Assembly) (CAL MARK Pulse Width Control) (2-2-2, Figure 25) as needed for proper pulse width.
9. Connect Oscilloscope External Trigger to SYNC Connector.
10. Set PRF/SQTR Thumbwheels to ***2000***, PRF/SQTR ON/OFF Switch to ***ON*** and TO/TAC/TD Switch to ***TO***.
11. Align leading edge of first pulse on left-most vertical graticule. Vary CAL Ø Control and verify pulses move a minimum of 360°.
12. Set POWER Switch to ***OFF***.
13. Disconnect test equipment.

(4) RF Check and Level

PREREQUISITES: 2-2-2D(1) Power Supply
2-2-2D(7) XPDR/DME Pulse Shaping

TEST EQUIPMENT: 1 Frequency Counter
1 Power Meter with 51075 Sensor
1 Spectrum Analyzer
1 Power Supply
1 50 Ω Coaxial Cable (BNC to Type N)
1 VSWR Bridge

SET-UP DIAGRAM: None

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CW/NORM/OFF Switch	***CW***
TACAN ON/OFF Switch	***OFF***
XPDR MODE Control	***A***
FREQ/FUNCTION/SELECT Thumbwheels	***1000 XPDR***
ΔF Thumbwheels	***000 OFF***

2. Connect Frequency Counter to RF I/O Connector (J15).
3. Set POWER Switch to ***ON***. Allow a 10 minute warm-up period.
4. Adjust RF LEVEL Control for 0 dBm as displayed on RF LEVEL -dBm Display.
5. Verify frequency displayed on Frequency Counter is 1000 MHz (±10 kHz).
6. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.
7. Remove Frequency Counter from RF I/O Connector (J15). Connect Power Meter to RF I/O Connector (J15).
8. Verify power level displayed on Power Meter is 0 dBm. Adjust R3229 (ALC/Mixer Assembly) (2-2-2, Figure 26) as needed for proper RF power level.
9. Remove SMB coaxial connector from J3202 (ALC/Mixer Assembly) (2-2-2, Figure 26). Verify RF power level (ALC headroom) increases minimum of 4 dB from level in Step 8.
10. Using external Power Supply, apply 5 Vdc to center conductor of J3202 (ALC/Mixer Assembly) (2-2-2, Figure 26). Verify RF output level decreases minimum of 4 dB from level in Step 8.
11. Remove external Power Supply from J3202. Reconnect coaxial cable to J3202.
12. Set FREQ/FUNCTION SELECT Thumbwheels to ***962 MHz***. Verify RF power level is 0 dB (±0.6 dB).
13. Disconnect coaxial cable from J3202. Verify RF power level (ALC headroom) increases minimum of 4 dBm from level in Step 12.
14. Using external Power Supply, apply 5 Vdc to center conductor of J3202 (ALC/Mixer Assembly) (2-2-2, Figure 26). Verify RF output level decreases minimum of 4 dB from level in Step 12.

STEP PROCEDURE

15. Remove external Power Supply from J3202. Reconnect coaxial cable to J3202.

16. Set FREQ/FUNCTION SELECT Thumbwheels to ***1213 MHz***. Verify RF power level is 0 dB (±0.6 dB).

17. Disconnect coaxial cable from J3202. Verify RF power level (ALC headroom) increases minimum of 4 dBm from level in Step 16.

18. Using external Power Supply, apply 5 Vdc to center conductor of J3202. Verify RF output level decreases a minimum of 4 dB from level in Step 16.

19. Remove external Power Supply from J3202.

20. Reconnect SMB coaxial connector to J3202.

21. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.

22. Verify RF power level displayed on Power Meter is 0 dBm. Adjust R3229 (ALC/Mixer Assembly) (2-2-2, Figure 26) as needed for proper RF power level.

23. Using Power Meter, verify RF power level as shown in 2-2-2, Table 48 for frequencies selected on FREQ/FUNCTION SELECT Thumbwheels.

FREQ/FUNCTION SELECT THUMBWHEELS SETTING	RF POWER OUTPUT
962 MHz	0 dBm (±0.6 dB)
1000 MHz	0 dBm (±0.6 dB)
1050 MHz	0 dBm (±0.6 dB)
1100 MHz	0 dBm (±0.6 dB)
1150 MHz	0 dBm (±0.6 dB)
1213 MHz	0 dBm (±0.6 dB)

RF Power Level versus Frequency
Table 48

24. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz***.

25. Decrease RF LEVEL Control in 1 dB increments from ***0*** to ***-30 dBm***. Verify RF LEVEL -dBm display and Power Meter reflect same RF level (±0.3 dB).

26. Disconnect Power Meter from RF I/O Connector. Connect VSWR Bridge with Spectrum Analyzer to RF I/O Connector. Verify VSWR, on Spectrum Analyzer, is 1.2:1 from 1020 to 1155 MHz.

27. Disconnect VSWR Bridge from RF I/O Connector. Connect Spectrum Analyzer to RF I/O Connector. Set Spectrum Analyzer controls as follows:

CONTROL	SETTING
Center Frequency Control	1090 MHz
Sensitivity Control	2 dB/Div
Video Filter Control	300 Hz
Dispersion Control	50 kHz/Div
Bandwidth Control	30 kHz
Reference Level	-30 dBm
Sweep Control	20 ms/Div

STEP PROCEDURE

28. Decrease RF LEVEL Control in 1 dB increments from ***-30*** to ***-110 dBm***. Verify RF LEVEL -dBm Display and Spectrum Analyzer reflect same RF LEVEL (±0.5 dB from -30 to -90 dBm and ±0.7 dB from -90 to -110 dBm).

    NOTE: Depending on Spectrum Analyzer used, a 30 dB Amplifier may be necessary on RF I/O Connector to display levels below -100 dBm.

29. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
RF LEVEL Control	***0 dBm***
CW/NORM/OFF Switch	***CW***
PRF/SQTR Thumbwheels	***0000***
FREQ/FUNCTION SELECT Thumbwheels	***1090 XPDR***

30. Set Spectrum Analyzer reference level to 0 dBm.

31. Adjust Spectrum Analyzer Center Frequency to position peak amplitude of CW signal at center of display.

32. Set CW/NORM/OFF Switch to ***OFF*** and Spectrum Analyzer Reference Level for -70 dB. Verify 80 dB is displayed on Spectrum Analyzer.

33. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X***. Verify 80 dBc is displayed on Spectrum Analyzer.

34. Set Spectrum Analyzer resolution to 50 kHz. Verify phase noise is 55 dBc at 150 kHz from center frequency.

35. Set FREQ/FUNCTION SELECT Thumbwheels to ***962 MHz X***. Verify phase noise is 55 dBc at 150 kHz from center frequency.

36. Set Spectrum Analyzer controls as follows:

CONTROL	SETTING
Sensitivity Control	***10 dB/Div***
Dispersion Control	***1 MHz/Div***
Sweep Control	***50 ms/Div***
Reference Level	***0 dBm***

    NOTE: Do not overdrive Spectrum Analyzer vertical amplifier, as this gives a false indication of spurs on ATC-1400A-2 RF level output.

37. After verification of signal from ATC-1400A-2 is referenced at 0 dB, set Spectrum Analyzer reference level to -20 dB.

38. While tuning Spectrum Analyzer center frequency from 350 to 1800 MHz, verify any or all spurs appearing on display are 60 dBc.

39. Set FREQ/FUNCTION SELECT Thumbwheels to ***1100 MHz***.

40. While tuning Spectrum Analyzer center frequency from 350 to 1800 MHz, verify any or all spurs appearing on display are 60 dBc.

STEP PROCEDURE

41. Set FREQ/FUNCTION SELECT Thumbwheels to ***1200 MHz***.

42. While tuning Spectrum Analyzer center frequency from 350 to 1800 MHz, verify any or all spurs appearing on display are 60 dBc.

43. Set FREQ/FUNCTION SELECT Thumbwheels to ***1034 MHz***.

44. Set Spectrum Analyzer center frequency to 834 MHz and verify all spurs appearing on display are 60 dBc.

45. Set FREQ/FUNCTION SELECT Thumbwheels to ***1124 MHz***.

46. Set Spectrum Analyzer center frequency to 924 MHz and verify all spurs appearing on display are 60 dBc.

47. Set FREQ/FUNCTION SELECT Thumbwheels to ***1213 MHz***.

48. Set Spectrum Analyzer center frequency to 1013 MHz and verify all spurs appearing on display are 60 dBc.

49. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
RF LEVEL Control	***0 dBm***
PRF/SQTR Thumbwheels	***2700***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz X***

50. Set Spectrum Analyzer controls as follows:

CONTROL	SETTING
RF Input Level	0 dBm
Frequency Tuning	1090 MHz
Freq Span/Div	200 kHz
Resolution Control	100 kHz
dB/Div	10 dB
Time/Div	As required

51. Connect Spectrum Analyzer to RF I/O Connector.

52. Adjust frequency tuning on Spectrum Analyzer so center of displayed signal is centered on display. Vary RF LEVEL Control so display signal is at top graticule. Record amplitude of displayed signal.

53. Set CW/NORM/OFF Switch to ***NORM***. Record amplitude of displayed signal at ±800 kHz from center frequency.

54. Subtract amplitude of signal noted in Step 55 from center frequency level. Verify level difference is >60 dBc.

55. Set POWER Switch to ***OFF***.

56. Disconnect test equipment.

(5) TACAN AM

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT:
1 Oscilloscope
1 Modulation Meter
1 50 Ω Coaxial Cable (BNC to Type N)
1 50 Ω Coaxial Cable (BNC to BNC)

SET-UP DIAGRAM: None

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CW/NORM/OFF Switch	***CW***
DME DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TAC***
PRF/SQTR ON/OFF Switch	***ON***
IDENT TONE/OFF/CODE Switch	***OFF***
TACAN ON/OFF Switch	***OFF***
DME REPLY EFFICIENCY Control	***100%***
PRF/SQTR Thumbwheels	***2000***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz Y***
ΔF Thumbwheels	***000 OFF***

2. Adjust RF LEVEL Control from -50 dBm to 3 dB past Lock-On, on Modulation Meter, approximately -25 dBm, as displayed on RF LEVEL -dBm Display.

   CAUTION: DO NOT OVERDRIVE INPUT TO MODULATION METER, AS THIS CAUSES ERRONEOUS % MODULATION READINGS ON THE MODULATION METER DISPLAY.

3. Connect Modulation Meter to RF I/O Connector.

4. Set Modulation Meter controls as follows:

CONTROL	SETTING
Tuning (Auto/Ext)	Auto
High Pass Filter (Hz)	300
Low Pass Filter (kHz)	3
Peak	Pk-Pk/2
Range	10
Function	kHz Deviation

5. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.

6. Verify peak to peak FM is <5 kHz at 1090 MHz.

7. Set FREQ/FUNCTION SELECT Thumbwheels to ***962 MHz***. Verify peak to peak FM is ≤5 kHz.

8. Set FREQ/FUNCTION SELECT Thumbwheels to ***1213 MHz***. Verify peak to peak FM is ≤5 kHz.

9. Set TACAN ON/OFF Switch to ***ON***. Connect Oscilloscope external trigger to SYNC Connector (J20) and Oscilloscope Channel A, using X10 probe, to P3201, Pin 7 (ALC/Mixer Assembly) (2-2-2, Figure 26).

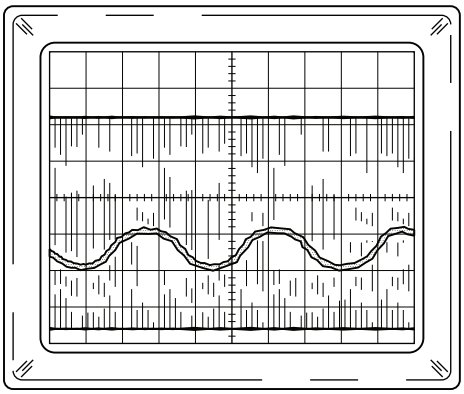
STEP PROCEDURE

10. Set Oscilloscope controls as follows:

CONTROL	SETTING
Vertical Sensitivity	0.05 V/Div
Coupling Switch	DC
Trigger Source Control	EXT SYNC
Sweep	2 ms/Div

11. Set CW/NORM/OFF Switch to ***NORM***.

12. Adjust R3224 (TACAN AM NULL Control) (ALC/Mixer Assembly) (2-2-2, Figure 26) for minimum ripple of waveform (top pulses) displayed on Oscilloscope (2-2-2, Figure 29).



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Displayed Waveform with Minimum Ripple
Figure 29

13. Set CW/NORM/OFF Switch to ***CW***.

14. Set Modulation Meter Controls as follows:

CONTROL	SETTING
Tuning	Auto
High Pass Filter (Hz)	10
Low Pass Filter (kHz)	3
Peak	Pk-Pk/2
Range	100
Function	% AM

15. Press spring loaded S2601 (TACAN Test Switch) (200 MHz Generator Assembly) (2-2-2, Figure 26) to left-most position (***15 Hz***). Verify Modulation Meter displays 21% (±1%).

16. Press spring loaded S2601 (TACAN Test Switch) (200 MHz Generator Assembly) (2-2-2, Figure 26) to right-most position (***135 Hz***). Verify Modulation Meter displays 21% (±1%).

17. With SW2601 in center position (***both 15 and 135 Hz***), verify Modulation Meter displays 42% (±2%).

    NOTE: Composite modulation may cause erroneous readings due to phase-lock circuitry in modulation meter.

18. Set POWER Switch to ***OFF***.

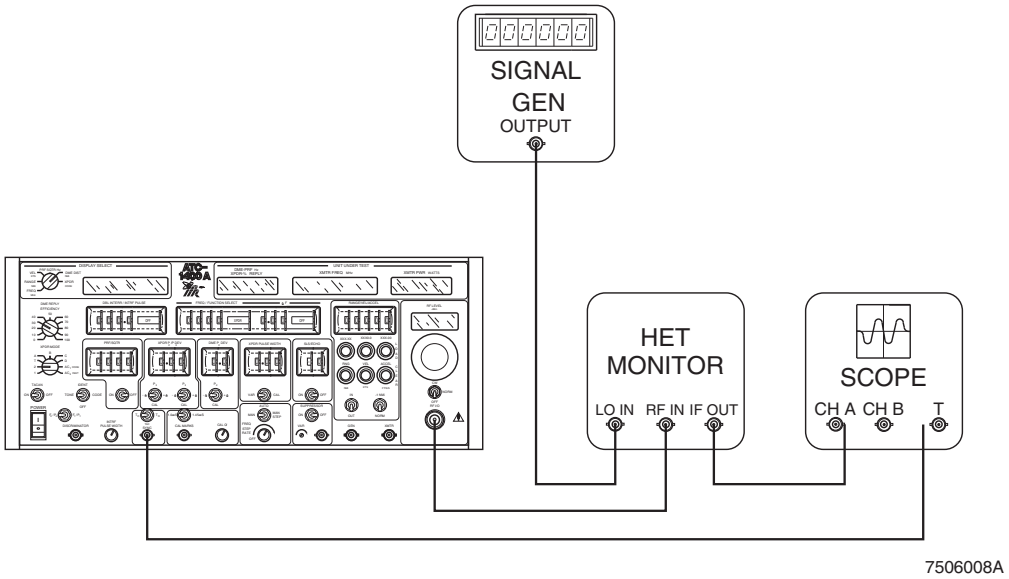
19. Disconnect test equipment.

(6) SLS Level

PREREQUISITES: 2-2-2D(1) Power Supply
2-2-2D(4) RF Check and Level

TEST EQUIPMENT: 1 Oscilloscope
1 Signal Generator
1 Heterodyne Monitor
3 50 Ω Coaxial Cables (BNC to BNC)
1 Power Meter with 57318 sensor

SET-UP DIAGRAM:



XPDR/DME Pulse Spacing and Shaping
Figure 30

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CW/NORM/OFF Switch	***NORMAL***
SLS/ECHO ON/OFF Switch	***OFF***
XPDR PULSE WIDTH VAR/CAL Switch	***CAL***
FREQ STEP RATE Control	***OFF***
MAN/AUTO/MAN STEP Switch	***MAN***
XPDR DEV P_3/CAL Switch	***CAL***
XPDR DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TO***
PRF/SQTR ON/OFF Switch	***ON***
POWER Switch	***ON***
TACAN ON/OFF Switch	***OFF***
XPDR MODE Control	***A***
PRF/SQTR Thumbwheels	***1000***
FREQ/FUNCTION SELECT Thumbwheels	***1090 XPDR***
SLS/ECHO Thumbwheels	***-0***
RF LEVEL Control	***-10***

STEP PROCEDURE

2. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 30.

3. Set Signal Generator for 1090 MHz at +5 dBm.

4. Set Oscilloscope controls as follows:

CONTROL	SETTING
Vertical Sensitivity Control	0.01 V/Div
Trigger Source Control	EXT SYNC Trigger

5. Using Vernier Control, position peak of positive going P_1 pulse on third horizontal axis (one graticule division above major horizontal axis). Adjust vertical vernier so P_1 pulse amplitude is five graticule divisions on Oscilloscope display.

6. Set Oscilloscope Vertical Sensitivity Control to **0.005 V/Div**.

7. Using positioning control, position peak of P_1 pulse on horizontal axis one graticule position from top of CRT display.

8. Set CW/NORM/OFF Switch to ***CW***. Verify difference between transponder pulse level and CW is ≤2%.

9. Set CW/NORM/OFF Switch to ***NORM***, FREQ/FUNCTION SELECT Thumbwheels to ***MHz X*** and TO/TAC/TD Switch to ***TD***.

10. Verify difference between DME pulse level and CW is ≤2%.

11. Set PRF/SQTR Thumbwheels to ***1010***. Record reference level. Set PRF/SQTR Thumbwheels to ***10*** and verify % change is ***<1%***.

12. Set TO/TAC/TD Switch to ***TO***, PRF/SQTR Thumbwheels to ***1010*** and FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.

13. Record reference level. Set PRF/SQTR Thumbwheels to ***10*** and verify % change is <1%.

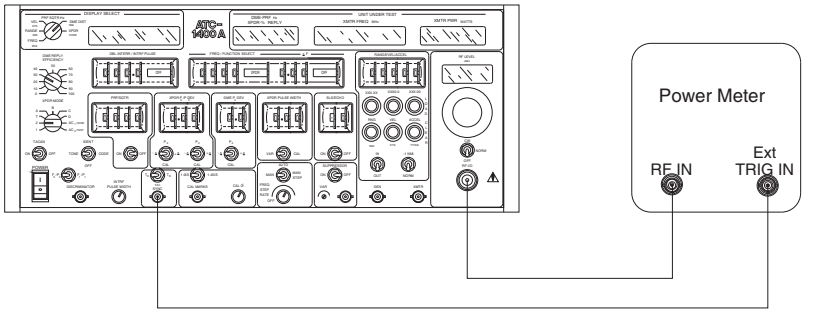
14. Using positioning control, position peak of P_1 pulse on horizontal axis one graticule from top of CRT display.

15. Set XPDR PULSE WIDTH VAR/CAL Switch to ***VAR*** and XPDR PULSE WIDTH Thumbwheels to ***0.20 µs***. Verify change in amplitude is <3%.

16. Set XPDR PULSE WIDTH Thumbwheels to ***0.45 µs***. Verify change in amplitude is <2%.

17. Disconnect test equipment and connect power meter sensor to ATC-1400A-2 RF I/O as shown in Figure 31.

STEP PROCEDURE



7506008

SLS Level Calibration Test Setup Diagram
Figure 31

18. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
SLS/ECHO ON/OFF Switch	***ON***
XPDR PULSE WIDTH VAR/CAL Switch	***CAL***
FREQ STEP RATE Control	***OFF***
MAN/AUTO/MAN STEP Switch	***MAN***
XPDR DEV P_3/CAL Switch	***CAL***
XPDR DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TO***
PRF/SQTR ON/OFF Switch	***ON***
XPDR MODE Control	***A***
PRF/SQTR Thumbwheels	***1000***
SLS/ECHO Thumbwheels	***-0***
RF LEVEL Control	***-10***

STEP PROCEDURE

19. Set Power Meter as follows:

CONTROL	SETTING
Measure	**Pulse Mode**
Offset	**0**
Frequency	**1090 MHz**
Averaging	**64**
Cal factor	**0.0**
Video Bandwidth	**High**
Vertical Span	**20 dB**
Vertical Center	**-10 dBm**
Unit Log	**dBm**
Resolution	**X.XXX**
Marker Mode	**Vertical**
Time Span	**5.0 uS**
Time Position	**Middle**
Time Delay	**2.0 uS**
Trig Level	**-10 dBm**
Trig Slope	**Positive**
Hold off	**0.00**
Trig Source	**Sensor 1**
Trig Mode	**Auto**

20. Push the “GRAPH’ button twice to get menu settings at top of screen.

STEP PROCEDURE

21. Push the left or right arrow key until 'Marker 1" selection appears.

22. Push the up or down arrow key to center Marker 1 in the middle of the first pulse.

23. Push the left or right arrow key until 'Marker 2" selection appears.

24. Push the up or down arrow key to center Marker 2 in the middle of the second pulse.

25. Push the "GRAPH' button once to get marker readings at top of screen.

26. Subtract the Marker 2 reading from the Marker 1 reading to determine the level difference between P_1 and P_2. Verify level of P_2 (SLS Pulse) is equal to P_1 pulse. Adjust R2671 (SLS Calibration Adjust)(200 MHz Control PC Board Assembly, 2-2-2 Figure 26) as needed for proper results.

27. Set SLS/ECHO ON/OFF Switch to ON.

28. Subtract the Marker 2 reading from the Marker 1 reading to determine the level difference between P_1 and P_2. Verify level of P_2 (SLS Pulse) is equal to P_2 pulse. Adjust R2671 (SLS Calibration Adjust) (200 MHz Control PC Board Assembly, 2-2-2 Figure 26) as needed for proper results.

    NOTE: It may be necessary to alternately repeat Steps 26 and 28, as the adjustments are interactive and adjusting one SLS level may affect the other SLS level.

29. Set SLS/ECHO Thumbwheels to levels shown in 2-2-2, Table 49 and verify SLS pulse levels in 2-2-2, Table 49.

SLS/ECHO THUMBWHEELS SETTING	ACCEPTABLE SLS PULSE LEVEL (NONCOHERENT SLS)	ACCEPTABLE SLS PULSE LEVEL (SLS)
0 dB	reference with P_1 (±0.5 dB)	reference with P_1 (±0.2 dB)
-5 dB	-5 dB (±0.5 dB)	-5 dBm (±0.2 dB)
-10 dB	-10 dB (±0.5 dB)	-10 dBm (±0.2 dB)
3 dB	+3 dB (±0.5 dB)	+3 dBm (±0.2 dB)
6 dB	+6 dB (±0.5 dB)	+6 dBm (±0.5 dB)

SLS Pulse Level Chart
Table 49

30. Set SLS/ECHO ON/OFF Switch to ***OFF*** and RF LEVEL Control to ***-10 dB***.

31. Disconnect Power Meter Sensor from ATC-1400A-2 RF I/O.

32. Set POWER Switch to ***OFF***.

33. Disconnect test equipment.

(7) XPDR/DME Pulse Spacing and Shaping

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT: 1 Oscilloscope
1 Signal Generator
1 Heterodyne Monitor
3 50 Ω Coaxial Cables (BNC to BNC)

SET-UP DIAGRAM: 2-2-2, Figure 30

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CW/NORM/OFF Switch	***NORM***
SLS/ECHO ON/OFF Switch	***OFF***
XPDR PULSE WIDTH VAR/CAL Switch	***CAL***
FREQ STEP RATE Control	***OFF***
MAN/AUTO/MAN STEP Switch	***MAN***
XPDR DEV P_3/CAL Switch	***CAL***
XPDR DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TO***
PRF/SQTR ON/OFF Switch	***ON***
XPDR MODE Control	***A***
PRF/SQTR Thumbwheels	***2000***
FREQ/FUNCTION SELECT Thumbwheels	***1090 XPDR***
SLS/ECHO Thumbwheels	***-0***

2. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 30.

3. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.

4. Adjust RF LEVEL Control for ***-12 dBm*** as displayed on RF LEVEL -dBm Display.

5. Set Oscilloscope controls as follows:

CONTROL	SETTING
Vertical Sensitivity Control	0.005 V/Div
Trigger Source Control	EXT SYNC Trigger
Main Sweep	5 µs/Div

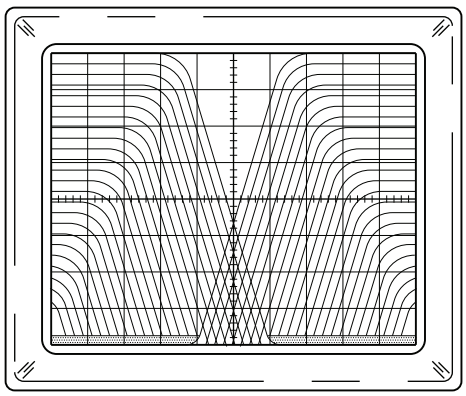
6. Adjust vertical Vernier Control for a 0 to 100% full display of P_1 pulse on Oscilloscope.

7. Set Oscilloscope Time Switch to ON and Sweep Delay Control to 0.05 µs/Div.

8. Verify P_1 pulse rise and fall time, from 10% to 90% point, is 70 ns (+10 ns, -20 ns).

STEP PROCEDURE

9. Using Oscilloscope start and stop controls, cross leading and trailing edge of P_1 pulse at 50% point (2-2-2, Figure 32). Verify pulse width is 0.8 µs (±5 ns). Adjust R2603 (XPDR Pulse Width Adjust) (200 MHz Control PC Board Assembly) (2-2-2, Figure 26) as needed for proper results.



7503002

XPDR P_1 Pulse with Leading and Trailing Edges Crossed at 50% Points
Figure 32

10. Set XPDR PULSE WIDTH VAR/CAL Switch to ***VAR*** and XPDR PULSE WIDTH Thumbwheels to ***0.20 µs***. Verify pulse width is 0.2 µs (±5 ns).

11. Set XPDR PULSE WIDTH Thumbwheels to ***1.85 µs***. Verify pulse width is 1.85 µs (±5 ns).

12. Set XPDR PULSE WIDTH VAR/CAL Switch to ***CAL***. Verify XPDR pulse spacing displayed on Oscilloscope for XPDR MODE Control is within tolerance as follows:

SETTING	PULSE SPACING
Mode 1	3.0 µs (±5 ns)
Mode 2	5.0 µs (±5 ns)
Mode T	6.5 µs (±5 ns)
Mode A/Mode 3	8.0 µs (±5 ns)
Mode B	17.0 µs (±5 ns)
Mode C	21.0 µs (±5 ns)
Mode D	25.0 µs (±5 ns)

13. Set SLS/ECHO ON/OFF Switch to ***ON***. Verify P_1 to P_2 pulse spacing is 2 µs (±5 ns).

14. Set XPDR P_2/P_3 DEV Thumbwheels to ***1.85*** and XPDR DEV P_2/CAL Switch to ***+Δ***. Verify P_1 to P_2 pulse spacing is 3.85 µs (±5 ns).

15. Set XPDR P_2/P_3 DEV Thumbwheels to ***0.90*** and XPDR DEV P_2/CAL Switch to ***-Δ***. Verify P_1 to P_2 pulse spacing is 1.10 µs (±5 ns).

16. Step XPDR P_2/P_3 DEV Thumbwheels from ***0.90*** to ***0.00 µs*** and verify P_1 to P_2 pulse spacing steps from 1.10 to 2.00 µs in 0.05 µs steps.

17. Set XPDR DEV P_2/CAL Switch to ***+Δ*** and step XPDR P_2/P_3 DEV Thumbwheels from ***0.00*** to ***1.85 µs***. Verify P_1 to P_2 pulse spacing steps from 2.00 to 3.85 µs in 0.05 µs steps.

STEP PROCEDURE

18. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
SLS/ECHO ON/OFF Switch	***OFF***
XPDR DEV P_3/CAL Switch	***+Δ***
XPDR DEV P_2/CAL Switch	***CAL***
XPDR MODE Control	***A***

19. Verify P_1 to P_3 pulse spacing is 9.85 µs (±5 ns).

20. Set XPDR DEV P_3/CAL Switch to ***-Δ***. Verify P_1 to P_3 pulse spacing is 6.15 µs (±5 ns).

21. Step XPDR P_2/P_3 DEV Thumbwheels from ***1.85*** to ***0.00 µs*** and verify P_1 to P_3 pulse spacing steps from 6.15 to 8.00 µs in 0.05 µs steps.

22. Set XPDR DEV P_3/CAL Switch to ***+Δ*** and step XPDR P_2/P_3 DEV Thumbwheels from ***0.00*** to ***1.85 µs***. Verify P_1 to P_3 pulse spacing steps from 8.00 to 9.85 µs in 0.05 µs steps.

23 Set XPDR DEV P_3/CAL Switch to ***CAL***.

24. Set DBL INTERR/INTRF PULSE Thumbwheels to ***17.5 INTERF-***. Verify on Oscilloscope a pulse is positioned 17.5 µs (±0.05 µs) before leading edge of P_1.

25. Set DBL INTERR/INTRF PULSE Thumbwheels to ***100.0 INTERF+***. Verify on Oscilloscope a pulse is positioned 100 µs (±0.05 µs) after leading edge of P_1.

26. Set DBL INTERR/INTRF PULSE Thumbwheels to ***399.0 INTERF+***. Verify on Oscilloscope a pulse is positioned 399 µs (±0.05 µs) after leading edge of P_1.

27. While stepping SLS/ECHO Thumbwheels from ***0*** to ***9*** and from ***-0*** to ***-9***, verify on Oscilloscope interference pulse follows in amplitude.

28. Set INTRF PULSE WIDTH Control ***fully ccw*** and DBL INTERR/INTRF PULSE Thumbwheels to ***50.0***. Verify on Oscilloscope interference pulse is <0.2 µs wide.

29. Set INTRF PULSE WIDTH Control ***fully cw***. Verify on Oscilloscope interference pulse is >5 µs.

30. Set DBL INTERR/INTRF PULSE Thumbwheels to ***035.0 DOUBLE***. Verify on Oscilloscope P_1 of second interrogation pulse occurs 35.0 µs (±1.05 µs) after leading edge of P_1 of first interrogation.

31. Set DBL INTERR/INTRF PULSE Thumbwheels to ***100.0 DOUBLE***. Verify on Oscilloscope P_1 of second interrogation pulse occurs 100 µs (±3 µs) after leading edge of P_1 of first interrogation.

32. Set SUPPRESSOR ON/OFF Switch to ***ON***. Verify first interrogation disappears, suppressor pulse occurs at previous position of P_3 and second interrogation moves so DBL INTERR/INTRF PULSE Thumbwheels reflect spacing between suppressor and P_1 of second interrogation.

33 Set SUPPRESSOR ON/OFF Switch to ***OFF***.

34. Set DBL INTERR/INTRF PULSE Thumbwheels to ***399.9 DOUBLE*** and PRF/SQTR Thumbwheels to ***1000***. Verify P_1 of second interrogation occurs 399.9 µs (±12 µs) after leading edge of P_1 of first interrogation.

STEP PROCEDURE

35. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
DME DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TD***
PRF SQTR ON/OFF Switch	***OFF***
IDENT TONE/OFF/CODE Switch	***OFF***
TACAN ON/OFF Switch	***OFF***
DBL INTERR/INTRF Pulse Thumbwheels	***000.0 OFF***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz Y***
SELF-INTERR/OFF Switch	***ON***

36. Set Oscilloscope Sweep delay counter to 0.5 µs/Div and Main Sweep to 10 µs.

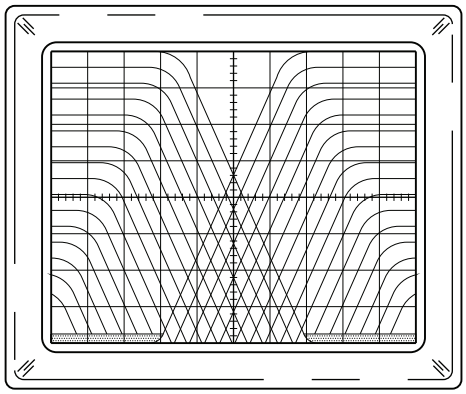
37. Adjust Vertical Vernier Control to position peak of P_1 pulse for 0 to 100% on Oscilloscope display.

38. Verify P_1 pulse rise time, from 10% to 90% point, is 2.0 µs (±0.25 µs).

39. Verify P_1 pulse fall time, from 10% to 90% point, is 2.5 µs (±0.25 µs).

40. Using Oscilloscope start and stop controls, cross leading and trailing edges of P_1 pulse at 50% point (2-2-2, Figure 33). Verify pulse width at 50% point is 3.5 µs (±0.5 µs). Adjust R2623 (Pulse Width Adjust) on 200 MHz Control PC Board Assembly (2-2-2, Figure 26) as needed for proper results of Steps 35, 36 and 37.

    NOTE: If R2623 is adjusted, repeat Steps 35 through 37. If Steps 35, 36, and 37 cannot all be satisfied, refer to assembly testing.



7503003

DME P_1 Pulse with Leading and Trailing Edges Crossed at 50% Points
Figure 33

41. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X***. Verify on Oscilloscope P_1 to P_2 pulse spacing is 12 µs (±0.1 µs).

42. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz Y***. Verify on Oscilloscope P_1 to P_2 pulse spacing is 30 µs (±0.1 µs).

43. Set DME DEV P_2/CAL Switch to ***+Δ***. While incrementing DME P_2 DEV Thumbwheels from ***0*** to ***7.9 µs***, verify P_2 pulse tracks in 0.1 µs steps.

44. Set DME DEV P_2/CAL Switch to ***-Δ***. While decrementing DME P_2 DEV Thumbwheels from ***7.9*** to ***0 µs***, verify P_2 pulse tracks in 0.1 µs steps.

STEP PROCEDURE

45. Set DME DEV P_2/CAL Switch to ***+Δ*** and DME P_2 DEV Thumbwheels to ***1.0***.

46. Verify P_1 to P_2 pulse spacing is 31.0 µs (±0.1 µs).

47. Set DME DEV P_2/CAL Switch to ***-Δ***. Verify P_1 to P_2 pulse spacing is 29 µs (±0.1 µs).

48. Set DME P_2 DEV Thumbwheels to ***7.9 µs***. Verify P_1 to P_2 pulse spacing is 22.1 µs (±0.1 µs).

49. Set DME DEV P_2/CAL Switch to ***+Δ***. Verify P_1 to P_2 pulse spacing is 37.9 µs (±0.1 µs).

50. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X*** and DME P_2 DEV Thumbwheels to ***1.0 µs***. Verify P_1 to P_2 pulse spacing is 13 µs (±0.1 µs).

51. Set DME DEV P_2/CAL Switch to ***-Δ***. Verify P_1 to P_2 pulse spacing is 11 µs (±0.1 µs).

52. Set DME P_2 DEV Thumbwheels to ***5.0 µs***. Verify P_1 to P_2 pulse spacing is 7.0 µs (±0.1 µs)).

53. Set DME DEV P_2/CAL Switch to ***+Δ*** and DME P_2 DEV Thumbwheels to ***7.9 µs***. Verify P_1 to P_2 pulse spacing is 19.9 µs (±0.1 µs).

54. Set CW/NORM/OFF Switch to ***CW*** and RF LEVEL Control to ***0 dBm***.

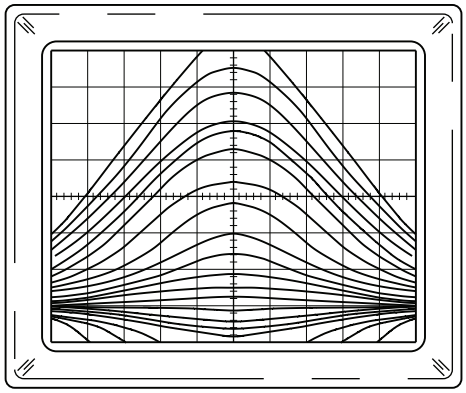
55. Connect Frequency Counter to RF I/O Connector. Record CW frequency output.

56. Disconnect Frequency Counter from RF I/O Connector.

57. Set CW/NORM/OFF Switch to ***NORM*** and RF LEVEL Control to ***-12 dBm***.

58. Connect Heterodyne Monitor to RF I/O Connector.

59. Connect Variable Frequency Generator to Heterodyne Monitor LO Connector. Adjust Variable Frequency Generator for a zero beat of DME pulse as seen on Oscilloscope. (Refer to 2-2-2, Figure 34 for typical display of frequency zero beat waveform.)



7503004

DME Pulse Zero Beat Waveform
Figure 34

STEP	PROCEDURE

60. Record DME Pulse Frequency of Variable Pulse Generator.

61. Subtract DME Pulse Frequency recorded in Step 60 from CW frequency recorded in Step 55. Verify difference is <10 kHz.

62. Set POWER Switch to ***OFF***.

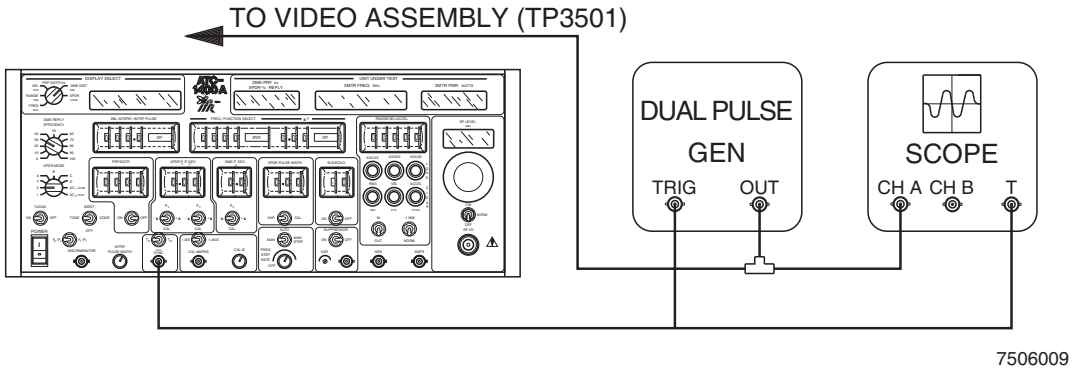
63. Disconnect test equipment.

(8) XPDR/DME Window Width and Positioning

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT:
1 Dual Pulse Generator
1 GPIB Controller
1 Oscilloscope
1 50 Ω Coaxial Cable (BNC to BNC)
1 50 Ω Coaxial Cable (BNC to SMA)
1 50 Ω BNC Tee Connector
1 Computer/Controller (GPIB Mode)

SET-UP DIAGRAM:



XPDR Window Width and Positioning Calibration Test Setup Diagram
Figure 35

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
MAN/AUTO/MAN STEP Switch	***MAN***
DISPLAY SELECT Control	***XPDR CODE***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz-X***
DECODER WIDE/NARROW Switch	***NARROW***
SELF-INTERR/OFF Switch	***OFF***

2. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 35.

3. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.

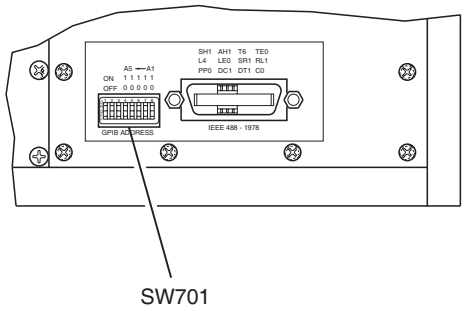
4. Set Dual Pulse Generator controls as follows:

CONTROL	SETTING
PRF Control	150 Hz
Amplitude Control	-1.2 V Peak
Pulse Width Control	0.8 µs
Spacing Control	12.00 µs

5. Verify "F" is not displayed in left-most digit of DME-PRF Hz/XPDR-%REPLY Display.

STEP	PROCEDURE

6. Set Dual Pulse Generator CAL/Vernier Switch to Vernier and output pulse spacing to 11.30 µs. Decrease or increase output pulse spacing until a flashing "F" is displayed on DME-PRF Hz/XPDR-%REPLY Display.
7. Verify spacing between two pulses is 11.25 µs (±0.1 µs).
8. Set Dual Pulse Generator CAL/Vernier Switch to CAL and output pulse spacing for 12.7 µs.
9. Set Dual Pulse Generator CAL/Vernier Switch to Vernie***r***. Increase or decrease output pulse spacing until a flashing "F" is displayed on DME-PRF Hz XPDR - % REPLY Display.
10. Verify spacing between two pulses is 12.75 µs (±0.1 µs).
11. If proper results cannot be obtained in Steps 5 through 10, perform Steps 12 through 14. When results are obtained go to Step 15.
12. Adjust Dual Pulse Generator output pulse spacing for 11.25 µs.
13. Adjust R412 (12 µs Decoder Adjust) (2-2-2, Figure 25) to threshold where "F" just disappears in left-most digit of DME-PRF Hz/XPDR-%REPLY Display.
14. Repeat procedures in Steps 5 through 10.
15. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz Y***.
16. Set Dual Pulse Generator CAL/Vernier Switch to CAL and output pulse spacing for 36.0 µs.
17. Verify a "F" is not displayed in DME-PRF Hz/XPDR-%REPLY Display.
18. Set Dual Pulse Generator CAL/Vernier Switch to Vernier and output pulse spacing to 35.3 µs. Decrease or increase output pulse spacing until a flashing "F" is displayed on DME-PRF Hz/XPDR-%REPLY Display.
19. Verify spacing between two pulses is 35.25 µs (±0.1 µs).
20. Set Dual Pulse Generator CAL/Vernier Switch to CAL and output pulse spacing for 36.7 µs.
21. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Increase or decrease output pulse spacing until a flashing "F" is displayed on DME PRF Hz/XPDR-%REPLY Display.
22. Verify spacing between two pulses is 36.75 µs (±0.1 µs).
23. If proper results cannot be obtained in Steps 16 through 22, perform Steps 24 through 26, otherwise go to Step 27.
24. Set Dual Pulse Generator output pulse spacing for 35.25 µs.
25. Set R419 (36 µs Decoder Adjust) (2-2-2, Figure 25) to threshold where "F" just disappears in left-most digit of DME-PRF Hz/XPDR-%REPLY Display.
26. Repeat procedures in Steps 16 through 22.



0103

STEP	PROCEDURE

27. Ensure Switch 3 of SW701 (Rear Panel) is set to ON.

28. Using external controller in GPIB mode, go to monitor mode by keying letter 0 and WDCF940 for narrow window. Verify TP403 (2-2-2, Figure 25) is high (invalid pair detection).

29. Set Dual Pulse Generator CAL/Vernier Switch to CAL and output pulse spacing for 24.0 µs.

30. Verify TP403 is low.

31. Set Dual Pulse Generator CAL/Vernier Switch to Vernier and output pulse spacing to 23.3 µs. Decrease or increase output pulse spacing until TP403 goes high.

32. Verify spacing between two pulses is 23.25 µs (±0.1 µs).

33. Set Dual Pulse Generator CAL/Vernier Switch to CAL and output pulse spacing for 24.7 µs.

34. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Increase or decrease output pulse spacing until TP403 goes high.

35. Verify spacing between two pulses is 24.75 µs (±0.1 µs).

36. If proper results cannot be obtained in Steps 27 through 35, perform Steps 37 through 39. When results are obtained go to Step 40.

37. Set Dual Pulse Generator output pulse spacing for 23.25 µs.

38. Set R417 (24 µs Decoder Adjust) (2-2-2, Figure 25) to threshold where TP403 goes high.

39. Repeat procedures in Steps 29 through 35.

40. Type "Q" and "!" to return to local mode.

41. Set DECODER WIDE/NARROW Switch to ***WIDE***.

42. Set Dual Pulse Generator CAL/Vernier Control Switch to CAL and output pulse spacing for 33.5 µs.

43. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Decrease or increase output pulse spacing until a flashing "F" is displayed on DME-PRF Hz/ XPDR % - REPLY Display.

STEP PROCEDURE

44. Verify spacing between two pulses is 33.5 µs (±0.4 µs).

45. Set Dual Pulse Generator CAL/Vernier to CAL and output pulse spacing for 38.5 µs.

46. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Increase or decrease output pulse spacing until a flashing "F" is displayed on DME-PRF Hz/ XPDR - % REPLY Display.

47. Verify spacing between two pulses is 38.5 µs (±0.4 µs).

48. Using external controller in GPIB Mode, go to monitor mode by keying letter 0 and WDCF950 for wide window. Verify TP403 is high (invalid pair detection).

49. Set Dual Pulse Generator CAL/Vernier Control Switch to CAL position and output pulse spacing for 21.5 µs.

50. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Decrease or increase output pulse spacing until TP403 goes high.

51. Verify spacing between two pulses is 21.5 µs (±0.4 µs).

52. Set Dual Pulse Generator CAL/Vernier to CAL and output pulse spacing for 26.5 µs.

53. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Increase or decrease output pulse spacing until TP403 goes high.

54. Verify spacing between two pulses is 26.5 µs (±0.4 µs).

55. Type "Q" and "!" to return to local mode.

56. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X***.

57. Set Dual Pulse Generator CAL/Vernier Switch to CAL and output pulse spacing to 9.5 µs.

58. Set Dual Pulse Generator CAL/Vernier Switch to Vernier. Decrease or increase output pulse spacing until a flashing "F" is displayed on DME-PRF Hz/XPDR-%REPLY Display.

59. Verify spacing between two pulses is 9.5 µs (±0.4 µs).

60. Set Dual Pulse Generator output pulse spacing to 14.5 µs**.**

61. Increase or decrease output pulse spacing until a flashing "F" is displayed on DME-PRF Hz/XPDR-%REPLY Display.

62. Verify spacing between two pulses is 14.5 µs (±0.4 µs).

63. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR*** and PRF/SQTR Thumbwheels to ***1000***, PRF/SQTR ON/OFF Switch to ON.

64. Trigger dual pulse generator on rising edge of TD Sync.

65. Verify ***100*** is displayed on DME-PRF Hz/XPDR-%REPLY Display.

66. Set Dual Pulse Generator output pulse spacing for 20.3 µs. Verify "F" is not displayed in leftmost digit of DISPLAY SELECT Readout.

67. Slowly decrease Dual Pulse Generator output pulse spacing to threshold where "F" just appears on DISPLAY SELECT Readout.

STEP	PROCEDURE

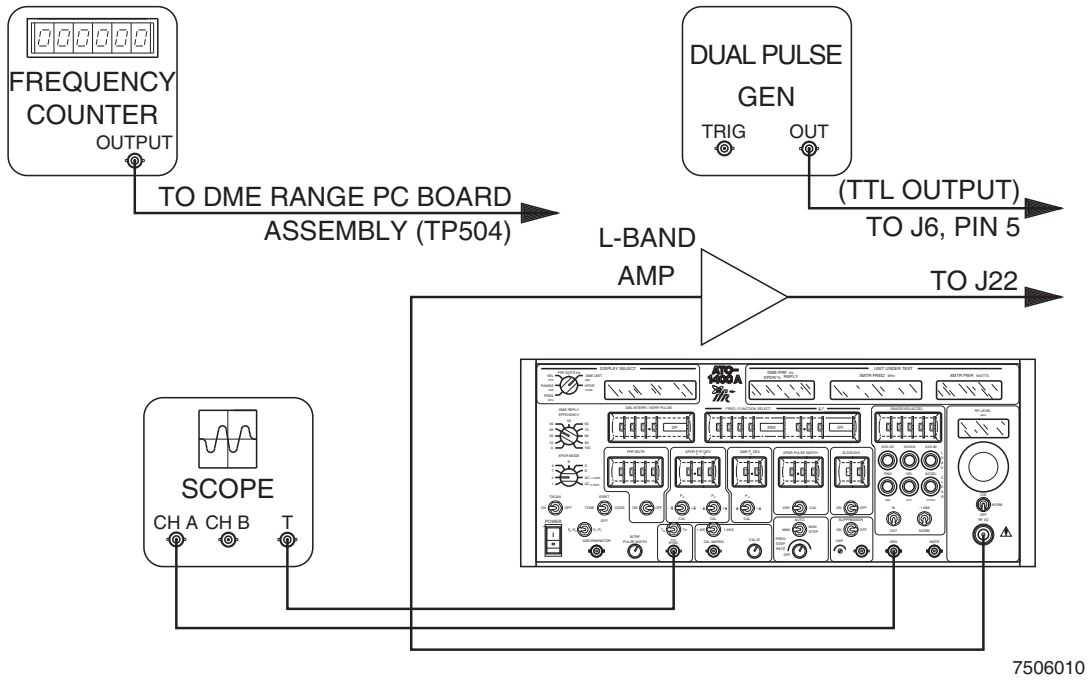
68. Using Oscilloscope, verify pulse spacing is 19.9 µs (±0.15 µs).
69. Slowly increase Dual Pulse Generator output pulse spacing to threshold where "F" disappears, then just reappears on DISPLAY SELECT Readout.
70. Using Oscilloscope, verify pulse spacing is 20.8 µs (±0.15 µs).
71. Set DECODER WIDE/NARROW Switch to ***NARROW***.
72. Set Dual Pulse Generator output pulse spacing for 20.19 µs (±10 ns).
73. Adjust R327 (Window Position Adjust) (2-2-2, Figure 25) as needed until "F" appears at one half brightness (flickering) on DISPLAY SELECT Readout.
74. Set Dual Pulse Generator output pulse spacing for 20.410 µs (±10 ns).
75. Adjust R330 (Window Width Adjust) (2-2-2, Figure 25) as needed until "F" appears at one half brightness (flickering) on DISPLAY SELECT Readout.
76. Set POWER Switch to ***OFF***.
77. Disconnect test equipment.

(9) X and Y Channel Range and R-NAV Delay

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT:
1 Frequency Counter
1 Dual Pulse Generator
1 Oscilloscope
3 50 Ω Coaxial Cables (BNC to BNC)
1 50 Ω Coaxial Cable (BNC to Type N)
1 50 Ω Coaxial Cable (BNC to E-Z Hook)
1 L-Band Amplifier

SET-UP DIAGRAM:



X and Y Channel Range and R-NAV Delay Calibration Test Setup Diagram
Figure 36

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
SLS/ECHO ON/OFF Switch	***OFF***
DME DEV P_2/CAL Switch	***-Δ***
TO/TAC/TD Switch	***TD***
PRF/SQTR ON/OFF Switch	***OFF***
IDENT TONE/OFF/CODE Switch	***OFF***
TACAN ON/OFF Switch	***OFF***
DME REPLY EFFICIENCY Control	***100%***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz Y***
DME P_2 DEV Thumbwheels	***5.0***
SLS/ECHO Thumbwheels	***0 dB***
SELF-INTERR/OFF Switch	***OFF***

STEP	PROCEDURE

2. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 36.
3. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.
4. Press CLEAR RNG Pushbutton Switch.
5. Verify 8.091269 MHz (±400 Hz) is displayed on Frequency Counter. Adjust C520 (Delay Osc Adjust) (2-2-2, Figure 25) as needed for proper reading.
6. Using Dual Pulse Generator, inject two negative going TTL pulses, spaced 36 µs apart, into pin 5 of AUXILIARY Connector (J6).
7. Adjust RF LEVEL Control for approximately 1 W input at EXTERNAL RF Connector (J22) or approximately ***100 W*** displayed.
8. Using Oscilloscope, verify a pulse pair corresponding to signal from dual pulse generator is displayed on Front Panel GEN Connector. Verify corresponding range reply. Verify spacing from P_1 of interrogation to P_1 of Range Reply is 56 µs (±247 ns). Adjust R2621 (Y Channel Delay Adjust) (2-2-2, Figure 26) as needed for proper spacing.
9. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X***, DME DEV P_2/CAL Switch to ***+Δ*** and DME P_2 DEV Thumbwheels to ***5.0***.
10. Using Dual Pulse Generator, inject two negative going TTL pulses, spaced 12 µs apart, into pin 5 of AUXILIARY Connector (J6).
11. Using Oscilloscope, verify pulse pair corresponding to signal from dual pulse generator is displayed on GEN Connector. Verify corresponding range reply. Verify spacing from P_1 of interrogation to P_1 of Range Reply is 50 µs (±247 ns). Adjust R2619 (X Channel Delay Adjust) (2-2-2, Figure 26) as needed for proper spacing.
12. Set RANGE/VEL ACCEL Thumbwheels to ***00100*** and press LOAD RNG Pushbutton Switch. Set -1 NMi/NORM Switch to ***-1***. Verify spacing between P_1 of interrogation pulse to P_1 of reply pulse is 50 µs (±247 ns).
13. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz Y*** and DME DEV P_2/CAL Switch to ***CAL***.
14. Set Dual Pulse Generator output pulse spacing for 36.0 µs. Verify spacing between interrogation pulse P_1 to reply pulse P_2 is 56 µs (±247 ns).
15. Set RANGE/VEL/ACCEL Thumbwheels to ***39900*** and -1 NMi/NORM Switch to ***NORM***.
16. Verify spacing between interrogation pulse P_1 to reply pulse P_1 is 4987.2 µs (±0.49 µs).
17. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X***.
18. Set Dual Pulse Generator output pulse spacing for 12.0 µs. Verify spacing between interrogation pulse P_1 to reply pulse P_1 is 4981.2 µs (±0.49 µs).
19. Remove TTL Output of Dual Pulse Generator from rear panel and connect 50 Ω output to TP3501 (2-2-2, Figure 26) with negative going video pulses.
20. Set SLS/ECHO ON/OFF Switch to ***ON***. Clear Range.

STEP PROCEDURE

21. Verify delay time of 420.8 μs (12 μs) between P_1 of Dual Pulse Generator and P_1 of echo reply, on Oscilloscope. Adjust R442 (Echo Delay Adjust) (2-2-2, Figure 25) as needed for proper delay time.

22. Set TO/TAC/TD Switch to ***TO***. Connect Oscilloscope Channel B to R-NAV Connector (J9).

23. Verify a pulse spacing of 50.0 μs (±0.25 μs) on Oscilloscope. Adjust R9257 (X Channel R NAV Adjust) (2-2-2, Figure 26) as needed for proper pulse spacing.

24. Using Oscilloscope, verify P_1 and P_2 pulse widths are 7 μs (±1.0 μs).

25. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz Y*** and Dual Pulse Generator output for 36 μs spacing.

26. Verify a pulse spacing of 56.0 μs (±0.25 μs) on Oscilloscope. Adjust R9256 Y Channel R NAV Adjust) (2-2-2, Figure 26) as needed for proper pulse spacing.

27. Using Oscilloscope, verify P_1 and P_2 pulse widths are 7 μs (±1.0 μs).

28. Disconnect Dual Pulse Generator from ATC-1400A-2. Connect Frequency Counter to GEN Connector.

29. Set IDENT TONE/OFF/CODE Switch to ***TONE***. Verify frequency displayed is 2700 Hz (±0.54 Hz).

    NOTE: Frequency Counter readout is double IDENT pulse rate, so it is necessary to divide by 2 to verify accuracy.

30. Disconnect Frequency Counter and connect Oscilloscope to GEN Connector.

31. Set EQUALIZER/OFF Switch to ***EQUALIZER***.

32. Verify equalizer pulse spacing between interrogation pulse P_1 and reply pulse P_1 is 100 μs (±10 μs).

33. Set PRF/SQTR ON/OFF Switch to ***ON***, IDENT TONE/OFF/CODE Switch to ***OFF***, PRF/SQTR Thumbwheels to ***2700*** and EQUALIZER/OFF Switch to ***OFF***.

34. Disconnect Oscilloscope from GEN Connector. Connect Frequency Counter to GEN Connector.

35. With Oscilloscope Probe, monitor TP408 and adjust R451 (2-2-2, Figure 25) as needed for 60 μs (±10 μs) low time.

36. Observe Frequency Counter and take average of random squitter frequency. Divide by 2, and verify squitter frequency is 2700 Hz (±29 Hz).

37. Set PRF/SQTR ON/OFF Switch to ***OFF***, PRF/SQTR Thumbwheels to ***0010*** and SELF-INTERR/OFF Switch to ***SELF-INTERR***.

38. Step PRF/SQTR Thumbwheels from ***10*** to ***5999 Hz***. Verify PRF/SQTR Thumbwheels track with display on frequency counter.

    NOTE: Frequency Counter readout is double PRF/SQTR Thumbwheel setting, so it is necessary to divide by 2 to verify accuracy.

39. Reconnect 50 Ω Termination to EXTERNAL RF Connector (J22).

40. Set POWER Switch to ***OFF***.

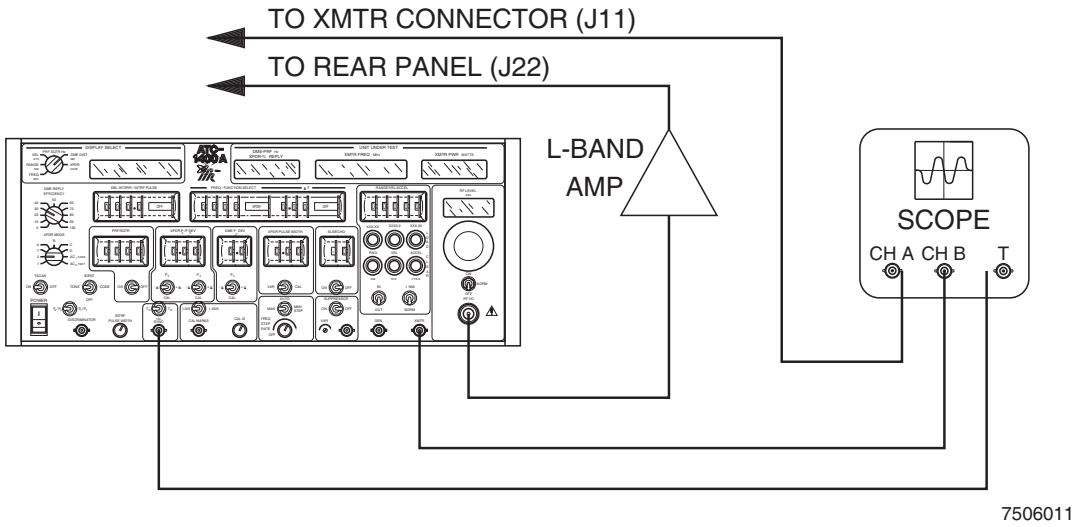
41. Disconnect test equipment.

(10) 50% Video Slicer and Transmitter Power

PREREQUISITES: 2-2-2D(1) Power Supply

TEST EQUIPMENT:
1 Peak Power Meter
1 Pulsed RF Power Source
1 Directional Coupler
1 Oscilloscope
1 L Band Amplifier
1 50 Ω Coaxial Cable (BNC to Type N)
4 50 Ω Coaxial Cables (BNC to BNC)

SET-UP DIAGRAM:



50% Video Slicer Calibration Test Setup Diagram
Figure 37

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 37.
2. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.
3. Set ATC-1400A-2 controls as follows:

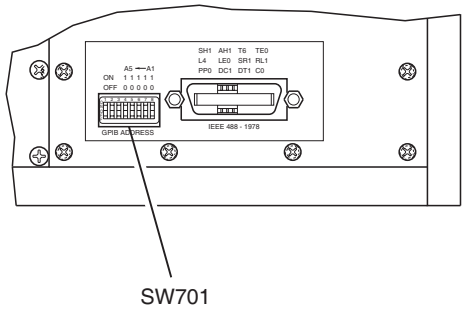
CONTROL	SETTING
DME DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TD***
PRF/SQTR ON/OFF Switch	***OFF***
PRF/SQTR Thumbwheels	***150***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz Y***
SELF-INTERR/OFF Switch	***ON***

4. Rotate RF LEVEL Control until ***500 W*** is displayed on XMTR PWR Watts Display.
5. Using Oscilloscope, verify 50% video pulse aligns with Gaussian shaped pulse at 50% point.

STEP PROCEDURE

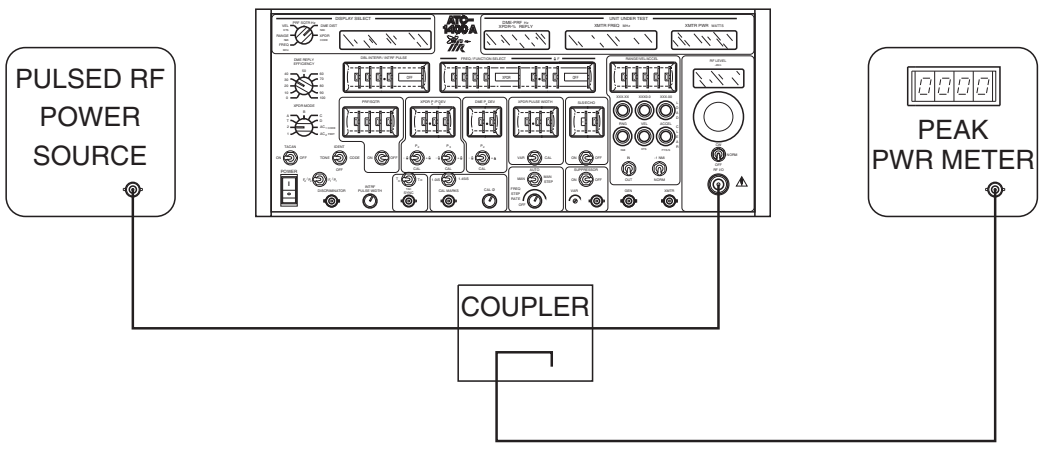
6. Using Oscilloscope, verify 0.6 Vp-p (typical) at 500 W.F
7. Adjust Oscilloscope sweep and positioning controls until displayed 50% video pulse is 10 graticules long.
8. Rotate RF LEVEL Control until ***50 W*** is displayed on XMTR PWR WATTS Display.
9. Using Oscilloscope, verify 50% video pulse is minimum 9.5 graticules long.

   NOTE: If amplifier is compressing, test is inaccurate. Amplifier must be linear.



0103

10. Ensure Switches 1 and 2 of SW701 (Rear Panel) are set to ON.
11. Rotate RF LEVEL Control ccw until XMTR PWR WATTS Display indicates ***2 W***.
12. Verify 50% video pulse displayed on Oscilloscope does not oscillate or disappear. Decrease level and verify slicer quits between 1 and 2 W reading.
13. Reconnect 50 Ω Termination to EXTERNAL RF Connector (J22).
14. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 38.



7506012

Transmitter Power Calibration Test Setup Diagram
Figure 38

STEP	PROCEDURE

15. Set CW/NORM/OFF Switch to ***OFF***.

16. Apply ac power to Pulsed RF Power source. Record power level on Peak Power Meter for later reference.

17. Adjust R7103 (Power Adjust) (2-2-2, Figure 26) as needed for reading on XMTR POWER WATTS Display ten times value indicated on Peak Power Meter. (Power readout is ±0.5 dB of applied power.)

18. Decrease power level 10 dB. Verify reading is 10X less than reading in Step 16. Adjust R7103 as needed for proper reading. Increase power level 10 dB and verify reading is 10X more than previous reading. Repeat as needed for proper results.

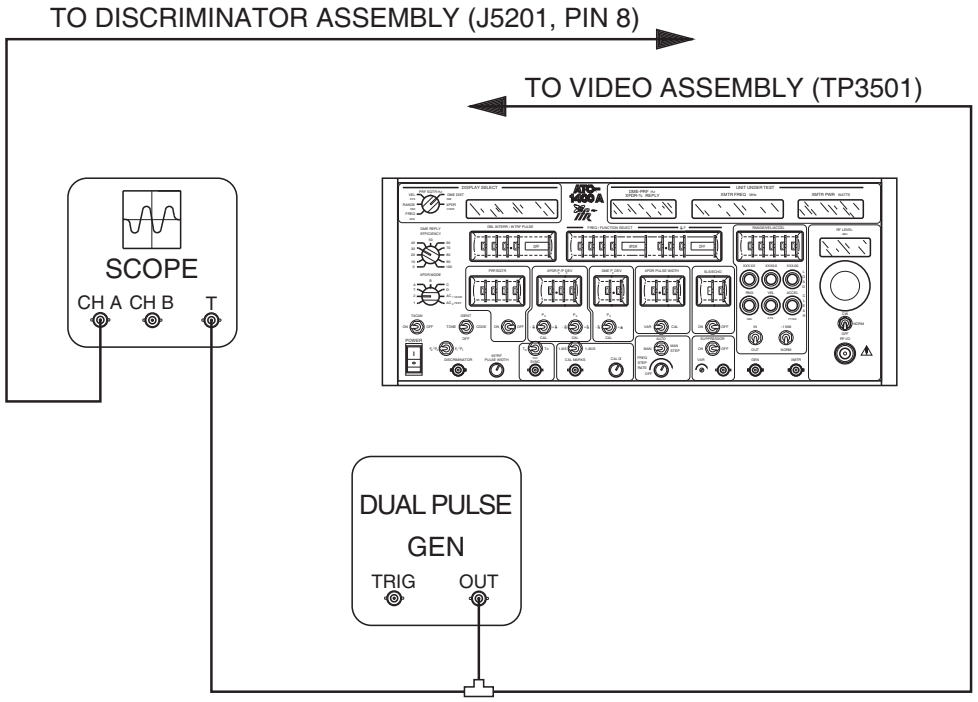
19 Set POWER Switch to ***OFF***. Disconnect test equipment.

(11) Discriminator Frequency

PREREQUISITES: 2-2-2D(1) Power Supply
2-2-2D(4) RF Check and Level

TEST EQUIPMENT:
1 Oscilloscope
1 Dual Pulse Generator
1 L Band Amplifier
1 50 Ω BNC Tee Connector
1 50 Ω Load
4 50 Ω Coaxial Cables (BNC to BNC)
1 50 Ω Coaxial Cable (SMB to BNC)

SET-UP DIAGRAM:



7506013

P_1/P_2 Positioning Calibration Test Setup Diagram
Figure 39

NOTE: If during performance of this procedure, a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CW/NORM/OFF Switch	***NORM***
SLS/ECHO ON/OFF Switch	***OFF***
XPDR PULSE WIDTH VAR/CAL Switch	***VAR***
DME DEV P_2/CAL Switch	***CAL***
XPDR DEV P_3/CAL Switch	***-.65***
TO/TAC/TD Switch	***TO***
PRF/SQTR ON/OFF Switch	***OFF***
F_2/P_2 F_1/P_1 Switch	***F_1/P_1***
IDENT TONE/OFF/CODE Switch	***OFF***
TACAN ON/OFF Switch	***OFF***
XPDR MODE Control	***C***
DISPLAY SELECT Control	***FREQ MHz***
PRF/SQTR Thumbwheels	***102***
DBL INTERR/INTRF PULSE Thumbwheels	***OFF***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz Y***
ΔF Thumbwheels	***1.00 OFF***
XPDR PULSE WIDTH Thumbwheels	***0.45***
DECODER WIDE/NARROW Switch	***WIDE***
SELF-INTERR/OFF Switch	***ON***

2. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 39.

3. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.

4. Set Dual Pulse Generator controls as follows:

CONTROL	SETTING
PRF Control	102 Hz
Amplitude Control	-1.2 V Peak
Pulse Width Control	0.8 µs
Spacing Control	36 µs

5. Verify P_1 pulse is displayed on Oscilloscope.

6. Set F_2/P_2 F_1/P_1 Switch to ***F_2/P_2***.

7. Verify P_2 pulse is displayed on Oscilloscope.

   NOTE: P_2 pulse is positioned 36 µs after P_1 pulse noted in Step 5.

8. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.

9. Set Dual Pulse Generator output pulse spacing to 21 µs.

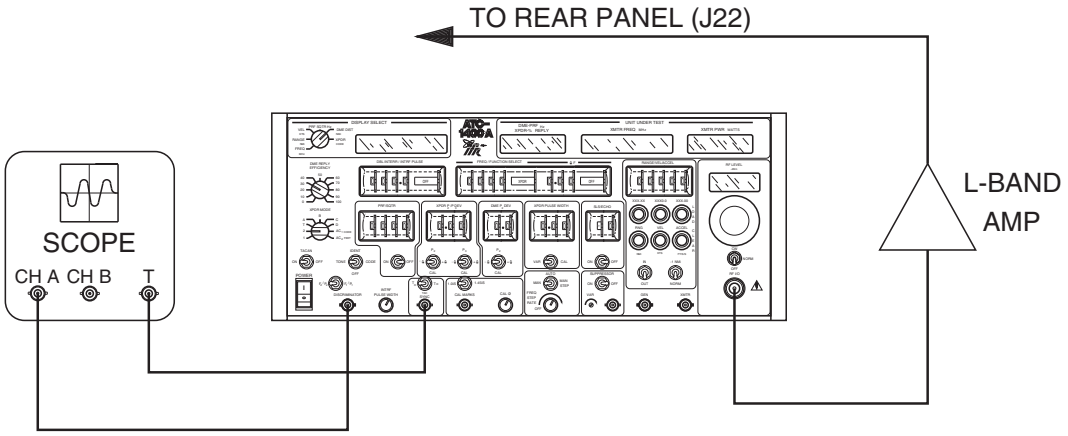
10. Verify F_2 pulse is displayed on Oscilloscope.

11. Set Dual Pulse Generator output pulse spacing to 19 µs. Increment pulse spacing thumbwheels to 22.4 µs. Verify F_2 pulse is displayed on Oscilloscope between 19.8 µs (±0.2 µs) and 22 µs (±0.4 µs).

12. Set F_2/P_2 F_1/P_1 Switch to ***F_1/P_1***. Verify F_1 pulse is displayed on Oscilloscope.

13. Set POWER Switch to ***OFF***. Remove test equipment from ATC-1400A-2.

14. Connect test equipment to ATC-1400A-2 as shown in 2-2-2, Figure 40.



Discriminator Frequency Calibration Test Setup Diagram
Figure 40

STEP	PROCEDURE

15. Set POWER Switch to ***ON*** and allow 10 minute warm-up period.

16. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz Y*** and adjust RF LEVEL Control until approximately ***500 W*** is on XMTR PWR WATTS Display.

17. Adjust R5302 (Offset Adjust) (2-2-2, Figure 26) until frequency on XMTR FREQ MHz Display is equal to frequency on DISPLAY SELECT Readout.

18. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***, PRF/SQTR ON/OFF Switch to ***ON*** and rotate RF LEVEL Control until ***500 W*** (±50 W) is on XMTR PWR WATTS Display.

19. Adjust R5313 (Narrow Pulse Offset Adjust) (2-2-2 Figure 26) until frequency on XMTR FREQ MHz Display is equal to frequency on DISPLAY SELECT Readout.

20. Set FREQ/FUNCTION SELECT Thumbwheels to ***1020 MHz Y*** and PRF/SQTR ON/OFF Switch to ***OFF***. Verify frequency on XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.

21. Set FREQ/FUNCTION SELECT Thumbwheels to ***1155 MHz Y***. Verify frequency on XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout. Record frequency.

22. Set PRF/SQTR Thumbwheels to ***2 Hz***, PRF/SQTR ON/OFF Switch to ***ON*** and SELF-INTERR/OFF Switch to ***OFF***. Verify XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.

23. Set FREQ/FUNCTION SELECT Thumbwheels to ***1020 MHz Y***. Verify XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.

24. Set PRF/SQTR Thumbwheels to ***102***.

25. Rotate RF LEVEL Control until ***40 W*** (±5 W) is on XMTR PWR WATTS Display. Verify XMTR FREQ MHz Display is within ±20 kHz of frequency in Step 20.

STEP	PROCEDURE

26. Set FREQ/FUNCTION SELECT Thumbwheels to ***1155 MHz Y***. Verify frequency on XMTR FREQ MHz Display is within ±20 kHz of frequency in Step 21.

27. Set F_2/P_2 F_1/P_1 Switch to ***F_2/P_2***. Verify frequency displayed on XMTR FREQ MHz Display is same as recorded in Step 26.

28. Set FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***, F_2/P_2 F_1/P_1 Switch to ***F_1/P_1*** and PRF/SQTR ON/OFF Switch to ***ON***. Verify frequency on XMTR FREQ Hz Display is within ±50 kHz of frequency in Step 19.

29. Rotate RF LEVEL Control until ***1000 W*** (±100 W) is displayed on XMTR PWR WATTS Display. Verify frequency on XMTR FREQ MHz Display is within ±50 kHz of frequency in Step 19.

30. Rotate RF LEVEL Control until ***500 W*** (±50 W) is displayed on XMTR PWR WATTS Display.

31. Set XPDR PULSE WIDTH Thumbwheels to ***0.55***. Verify frequency on XMTR FREQ MHz Display is within ±50 kHz of frequency in Step 19.

32. Set XPDR PULSE WIDTH Thumbwheels to ***0.35***. Verify frequency on XMTR FREQ MHz Display is within ±50 kHz of frequency in Step 19.

33. Set XPDR PULSE WIDTH Thumbwheels to ***0.30***. Verify frequency on XMTR FREQ MHz Display is within ±50 kHz of frequency in Step 19.

34. Set XPDR PULSE WIDTH Thumbwheels to ***0.45***.

35. Set XPDR Mode Control to ***Mode A***. After Discriminator locks on, set F_2/P_2 F_1/P_1 Switch to ***F_2/P_2***. Record dc level displayed on Oscilloscope for later reference.

36. While monitoring Oscilloscope display, set ΔF Thumbwheels to ***1.00 +Δ*** and verify dc level shifts approximately 1 V from level recorded in Step 35.

37. While monitoring Oscilloscope display, set ΔF Thumbwheels to ***1.00 -Δ*** and verify dc level shifts approximately -1 V from level recorded in Step 35.

38. Using BNC Tee Connector, connect 50 Ω Load parallel with Oscilloscope.

39. Set ΔF Thumbwheels to ***OFF***. Record dc level displayed on Oscilloscope for later reference.

40. While monitoring Oscilloscope, set ΔF Thumbwheels to +Δ and verify dc level shifts approximately +0.5 V from level recorded in Step 39.

41. While monitoring Oscilloscope, set ΔF Thumbwheels to -Δ and verify dc level shifts approximately -0.5 V from level recorded in Step 39.

42. Replace 50 Ω Terminations on TP3501 and J22.

43. Set POWER Switch to ***OFF***.

44. Disconnect test equipment.

(12) Parameter Verifications

The following procedure is strictly a verification of parameters for:

Reply Efficiency (DME Mode)
TO, TD, TAC Sync
Percent Reply (XPDR Mode)
Velocity at 1000 Knots
Generator Output Voltage
Mutual Suppression Pulse
Acceleration
PRF at 1000 Hz
Auto/Freq Step Rate
Coupler Loss

PREREQUISITES: None

TEST EQUIPMENT:
1 Oscilloscope
1 Dual Pulse Generator
1 Frequency Counter
1 Signal Generator
1 Totalizing Counter
1 2.0 kΩ Resistor
1 50 Ω Load
1 Stopwatch

SET-UP DIAGRAM: None

NOTE: During performance of this procedure, if a certain condition or specification cannot be verified, refer to appropriate assembly test procedure in 2-2-4 for testing and repair of faulty assembly.

STEP PROCEDURE

1. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
CW/NORM/OFF Switch	***NORM***
SUPPRESSOR ON/OFF Switch	***ON***
SLS/ECHO ON/OFF Switch	***OFF***
XPDR PULSE WIDTH VAR/CAL Switch	***CAL***
DME DEV P_2/CAL Switch	***CAL***
XPDR DEV P_3/CAL Switch	***CAL***
XPDR DEV P_2/CAL Switch	***CAL***
TO/TAC/TD Switch	***TO***
PRF/SQTR ON/OFF Switch	***ON***
POWER Switch	***ON***
PRF/SQTR Thumbwheels	***1000***
DBL INTERR/INTERF PULSE Thumbwheels	***0000 OFF***
FREQ/FUNCTION SELECT Thumbwheels	***1090 XPDR***

2. Connect Oscilloscope External Trigger to SYNC Connector, Oscilloscope Channel A (loaded with 2.0 kΩ resistor to ground) to SUPPRESSOR OUTPUT Connector and Oscilloscope Channel B to GEN Connector.

3. Verify on Oscilloscope Channel A, displayed pulse width is 33 µs (±3 µs).

4. Set SUPPRESSOR VAR Adjustment ***fully ccw***. Verify pulse amplitude is <3 V.

5. Set SUPPRESSOR VAR Adjustment ***fully cw***. Verify pulse amplitude is >27 V.

6. Adjust SUPPRESSOR VAR Adjustment for ***18.5 V***, as displayed on Oscilloscope.

STEP	PROCEDURE

7. Set Oscilloscope to Alternate. Verify leading edge of suppressor pulse is approximately .8 µs with leading edge of XPDR P_3 pulse.

8. Set PRF/SQTR ON/OFF Switch to ***OFF***, TO/TAC/TD Switch to ***TD***, FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz Y*** and SELF-INTERR/OFF Switch to ***SELF-INTERR***.

9. Verify leading edge of suppressor pulse occurs approximately 3.5 µs before P_1 of range reply pulse.

10. Verify amplitude of generator pulses are approximately 0.5 V_{P-P} into 50 Ω Load.

11. Set TO/TAC/TD Switch to ***TO***, PRF/SQTR ON/OFF Switch to ***ON*** and FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.

12. Verify leading edge of P_1 occurs approximately 20 µs after beginning of Oscilloscope trace.

13. Set TO/TAC/TD Switch to ***TD*** and verify leading edge of P_3 occurs at beginning of Oscilloscope trace.

14. Set PRF/SQTR ON/OFF Switch to ***OFF*** and FREQ/FUNCTION SELECT Thumbwheels to ***1090 MHz X***.

15. Verify P_1 of range reply occurs approximately 3.5 µs after beginning of Oscilloscope trace.

16. Set TO/TAC/TD Switch to ***TAC***, TACAN ON/OFF Switch to ***ON*** and SELF-INTERR/OFF Switch to ***OFF***.

    NOTE: Oscilloscope syncs on main burst.

17. Verify pulse spacing between leading edge of first pulse to leading edge of second pulse is 12 µs and spacing between leading edge of second pulse to leading edge of third pulse is 18 µs.

18. Connect Frequency Counter to J904, pin 21B. For extra clarity, refer to Motherboard PC Board Assembly, part of Floor Assembly (2-2-5, Figure 88).

19. Set FREQ/FUNCTION SELECT Thumbwheels to ***MHz Y***, IN/OUT Switch to ***OUT***, RANGE/VEL/ACCEL Thumbwheels to ***1000 KTS*** and DISPLAY SELECT Control to ***RANGE***.

20. Press LOAD VEL Pushbutton Switch. Verify ***27.777 Hz*** (±0.014 Hz) is displayed on Frequency Counter.

21. Set POWER Switch to ***OFF***.

22. If needed, exchange places with PC Board Assemblies to move DME Range PC Board Assembly to top slot in Card Cage Assembly

23. Set POWER Switch to ***ON***.

24. Remove Frequency Counter from J904, pin 21B and connect to U515, Pin 5 (DME Range PC Board Assembly) (2-2-5, Figure 78).

25. Press CLEAR RNG Pushbutton Switch to clear all previous entered range, velocity and acceleration data.

STEP PROCEDURE

26. Set RANGE/VEL/ACCEL Thumbwheels to ***399***.

27. Depress LOAD ACCEL Pushbutton Switch and verify 23.644 Hz (±0.03 Hz) is displayed on Frequency Counter.

28. Remove Frequency Counter and replace ATC-1400A-2 Card Cage Assembly cover.

29. Set SLS/ECHO ON/OFF Switch to ***OFF***, PRF/SQTR Thumbwheels to ***1000*** and FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.

30. Connect Frequency Counter to GEN Connector.

31. Verify output on Frequency Counter at GEN Connector, divided by 2, is 999.95 to 1000.05 Hz (±0.005%).

32. Connect Dual Pulse Generator to TP3501 (Video Assembly) (2-2-2, Figure 26).

33. Set Dual Pulse Generator output pulse spacing for 12 μs, pulse width for 3 μs and PRF for 150 Hz.

34. Connect Totalizing Counter Channel A to GEN Connector (J10) and Totalizing Counter Channel B to SYNC Connector.

35. Set Totalizing Counter Function Control to A/B and Range Control to 10^2.

    NOTE: A/B selection on Totalizing Counter provides ratio of frequency of Channel A divided by frequency of Channel B.

36. Set ATC-1400A-2 controls as follows:

CONTROL	SETTING
SLS/ECHO ON/OFF Switch	***OFF***
TO/TAC/TD Switch	***TO***
PRF/SQTR ON/OFF Switch	***OFF***
DME REPLY EFFICIENCY Control	***100***
FREQ/FUNCTION SELECT Thumbwheels	***1090 MHz X***

37. Verify Totalizing Counter displays a frequency ratio of 2.0.

38. Set DME REPLY EFFICIENCY Control to ***0%*** reply rate. Verify Totalizing Counter displays a frequency ratio of 0.0.

39. Set Totalizing Counter range control to 105.

40. Set DME REPLY EFFICIENCY Control to ***50%*** reply rate. Verify Totalizing Counter displays a frequency ratio of 0.9 to 1.1.

41. Set DME REPLY EFFICIENCY Control to ***70%*** reply rate. Verify Totalizing Counter displays a frequency ratio of 1.3 to 1.5.

42. Set Display Select Control to PRF/SQTR***.***

43. Set PRF/SQTR ON/OFF Switch to ***ON***, PRF/SQTR Thumbwheels to ***500*** and FREQ/FUNCTION SELECT Thumbwheels to ***1090 XPDR***.

44. Connect Totalizing Counter Channel A to XMTR Connector.

45. Verify Totalizing Counter readout is 2X reading displayed on Display Select.

STEP	PROCEDURE

46. Set FREQ STEP RATE Control fully ccw (short of detent).

47. Simultaneously start Stopwatch and set MAN/AUTO/MAN STEP Switch to ***AUTO***. Verify minimum step rate is >10 seconds per channel.

    NOTE: Channel change is observed on DISPLAY SELECT Readout.

48. Set FREQ STEP RATE Control ***fully cw***.

49. Simultaneously start Stopwatch and set MAN/AUTO/MAN STEP Switch to ***AUTO***. Verify maximum step rate is <2 seconds per channel.

    NOTE: To obtain an accurate reading for above step rate, it is necessary to take an average of 10 steps (channels) as displayed on DISPLAY SELECT Readout.

50. Set POWER Switch to ***OFF***.

51. Disconnect test equipment.

E. Calibration/Verification Test Data Sheet

TECHNICIAN: _____ DATE: _____

ATC-1400A-2 S/N: _____

STEP	DATA	RESULT
(1) Power Supply		
1.	Dip Switch #1 (SW301) set to ***UP***	_____(√)
	Dip Switch #2 (SW301) set to ***DOWN***	_____(√)
2.	Dip Switch #1, #2 and #3 (SW501) set to ***UP***	_____(√)
	Dip Switch #4 (SW501) set to ***DOWN***	_____(√)
5.	ATC-1400A-2 front panel displays are in accordance with power-up self test.	_____(√)
7.	+5 V Microprocessor PC Board Assembly voltage 4.9 Vdc (±0.05 V)	_____
11.	ATC-1400A-2 front panel displays are in accordance with power-up self test.	_____(√)
13.	+5 V Video Assembly voltage ≤5.25 Vdc	_____
	+5 V Microprocessor PC Board Assembly voltage readjust 4.9 Vdc (±0.05 V)	_____
14.	+12 V Video Assembly voltage +12 Vdc (±0.2 V)	_____
15.	-12 V Video Assembly voltage -12 Vdc (±0.5 V)	_____
16.	-5 V Video Assembly voltage -5 Vdc (±0.2 V)	_____
(2) Counter Time Base		
2.	ATC-1400A-2 front panel displays are in accordance with power-up self test.	_____(√)
4.	5 MHz (±3 Hz)	_____
(3) CAL MARKS		
4.	689655 Hz (±34 Hz)	_____
6.	1 MHz (±50 Hz)	_____
8.	0.45 µs at 50% point	_____(√)
11.	Pulses move a minimum of 360°	_____ (√)

STEP	DATA	RESULT
(4) RF Check and Level		
5.	1000 MHz (±10 kHz)	_____
8.	0 dBm	_____
9.	RF power level (ALC headroom) increases ≥4 dB from Step 8 level.	_____
10.	RF output level decreases ≥4 dB from Step 8 level.	_____
12.	0 dB (±0.6 dB)	_____
13.	RF power level (ALC headroom) increases ≥4 dB from Step 12 level.	_____
14.	RF output level decreases ≥4 dB from Step 12 level.	_____
16.	0 dB (±0.6 dB)	_____
17.	RF power level (ALC headroom) increases ≥4 dB from Step 16 level.	_____
18.	RF output level decreases ≥4 dB from Step 16 level.	_____
22.	0 dBm	_____
23.	962 MHz 0 dBm (±0.6 dB)	_____
	1000 MHz 0 dBm (±0.6 dB)	_____
	1050 MHz 0 dBm (±0.6 dB)	_____
	1100 MHz 0 dBm (±0.6 dB)	_____
	1150 MHz 0 dBm (±0.6 dB)	_____
	1213 MHz 0 dBm (±0.6 dB)	_____
25.	RF LEVEL -dBm display and Power Meter reflect same RF level (±0.3 dB) from 0 to -30 dBm.	_____
26.	VSWR is 1.2:1 from 1020 to 1155 MHz.	_____(√)
28.	RF LEVEL -dBm Display and Spectrum Analyzer reflect same RF LEVEL (±0.5 dB from -30 to -90 dBm and ±0.7 dB from -90 to -110 dBm).	_____(√)
34.	$\geq$80 dB	_____
35.	$\geq$80 dBc	_____
36.	$\geq$55 dBc	_____
37.	$\geq$55 dBc	_____
40.	Spurs appearing on display are $\geq$-60 dBc.	_____

STEP	DATA	RESULT
42.	Spurs appearing on display are ≥-60 dBc.	_____
44.	Spurs appearing on display are ≥-60 dBc.	_____
46.	Spurs appearing on display are ≥-60 dBc.	_____
48.	Spurs appearing on display are ≥-60 dBc.	_____
50.	Spurs appearing on display are ≥-60 dBc.	_____
54.	Amplitude of displayed signal	_____
55.	Amplitude of displayed signal at ±800 kHz from center frequency	_____
56.	Amplitude difference of center frequency from signal noted in Step 55 is >60 dBc.	_____
(5) TACAN AM		
6.	<5 kHz at 1090 MHz	_____
7.	962 MHz <5 kHz	_____
8.	1213 MHz <5 kHz	_____
12.	TACAN AM Null	_____(√)
15.	21% (±1%)	_____
16.	21% (±1%)	_____
17.	42% (±2%)	_____
(6) SLS Level		
5.	P_1 pulse amplitude is five graticule divisions.	_____(√)
8.	≤2%	_____
10.	≤2%	_____
11.	Reference level	_____(√)
	% change is <1%	_____
13.	Reference level	_____(√)
	% change is <1%	_____
17.	Level of P_2 (SLS pulse) is equal to P_1 pulse.	_____(√)
21.	SLS pulse is aligned on third horizontal axis.	_____(√)

STEP	DATA	RESULT
22.	(Noncoherent SLS)	
	0 dB P_2 Level from -10 dBm P_1 Level -10 dBm (±0.5 dB)	_____
	-5 dB P_2 Level from -5 dBm P_1 Level 10 dBm (±0.5 dB)	_____
	-10 dB P_2 Level from 0 dBm P_1 Level -10 dBm (±0.5 dB)	_____
	3 dB P_2 Level from -13 dBm P_1 Level -10 dBm (±0.5 dB)	_____
	6 dB P_2 Level from -16 dBm P_1 Level -10 dBm (±0.5 dB)	_____
	(SLS)	
	0 dB P_2 Level from -10 dBm P_1 Level -10 dBm (±0.2 dB)	_____
	-5 dB P_2 Level from -5 dBm P_1 Level 10 dBm (±0.2 dB)	_____
	-10 dB P_2 Level from 0 dBm P_1 Level -10 dBm (±0.2 dB)	_____
	3 dB P_2 Level from -13 dBm P_1 Level -10 dBm (±0.2 dB)	_____
	6 dB P_2 Level from -16 dBm P_1 Level -10 dBm (±0.5 dB)	_____
26.	P_1 pulse amplitude is five graticule divisions	_____(√)
29.	Change in amplitude is <3%.	_____
30.	Change in amplitude is <2%.	_____
(7)	XPDR/DME Pulse Spacing and Shaping	
8.	Rise and Fall time 70 ns (±20 ns)	_____
9.	Pulse width 0.8 µs (±5 ns)	_____
10.	Pulse width narrow 0.2 µs (±5 ns)	_____
11.	Pulse width wide 1.85 µs (±5 ns)	_____
12.	Mode 1 pulse spacing 3.0 µs (±5 ns)	_____
	Mode 2 pulse spacing 5.0 µs (±5 ns)	_____
	Mode T pulse spacing 6.5 µs (±5 ns)	_____
	Mode A/Mode 3 pulse spacing 8.0 µs (±5 ns)	_____
	Mode B pulse spacing 17.0 µs (±5 ns)	_____
	Mode C pulse spacing 21.0 µs (±5 ns)	_____
	Mode D pulse spacing 25.0 µs (±5 ns)	_____
13.	P_1 to P_2 (SLS) pulse spacing 2 µs (±5 ns)	_____
14.	P_1 to P_2 (SLS) pulse spacing wide 3.85 µs (±5 ns)	_____
15.	P_1 to P_2 (SLS) pulse spacing narrow 1.10 µs (±5 ns)	_____
16.	P_1 to P_2 pulse spacing 1.10 to 2.00 µs in 0.05 µs steps	_____(√)
17.	P_1 to P_2 pulse spacing 2.00 to 3.85 µs in 0.05 µs steps	_____(√)

STEP	DATA	RESULT
19.	P_1 to P_3 pulse spacing wide 9.85 µs (±5 ns)	_____
20.	P_1 to P_3 pulse spacing narrow 6.15 µs (±5 ns)	_____
21.	P_1 to P_3 pulse spacing 6.15 to 8.00 µs in 0.05 µs steps	_____
22.	P_1 to P_3 pulse spacing 8.00 to 9.85 µs in 0.05 µs steps	_____
24.	Interference pulse occurs 17.5 µs (±0.05 µs) before leading edge of P_1.	_____
25.	Interference pulse occurs 100 µs (±0.05 µs) after leading edge of P_1.	_____
26.	Interference pulse occurs 399 µs (±0.05 µs) after leading edge of P_1.	_____
27.	Interference pulse amplitude varies from -9 to +9 dB P_1.	_____ (√)
28.	Interference pulse width narrow is <0.2 µs.	_____
29.	Interference pulse width wide is >5 µs	_____
30.	P_1 of first interrogation to P_1 of second interrogation 35.0 µs 33.95 to 36.05 µs	_____
31.	P_1 of first interrogation to P_1 of second interrogation 100 µs 97 to 103 µs	_____
32.	First interrogation disappears.	_____ (√)
	Suppressor pulse is coincident with previous P_3 position.	_____ (√)
	Second interrogation changes position.	_____ (√)
34.	P_1 of first interrogation to P_1 of second interrogation 399.9 µs 387.9 to 411.9 µs	_____
38.	P_1 pulse rise time 2.0 µs (±0.25 µs)	_____
39.	P_1 pulse fall time 2.5 µs (±0.25 µs)	_____
40.	P_1 pulse width 3.5 µs (±0.5 µs)	_____
41.	1090 MHz X P_1 to P_2 pulse spacing 12 µs (±0.1 µs)	_____
42.	1090 MHz Y P_1 to P_2 pulse spacing 30 µs (±0.1 µs)	_____
43.	1090 MHz Y P_1 to P_2 pulse spacing 30 to 37.9 µs in 0.1 µs steps	_____ (√)
44.	1090 MHz Y P_1 to P_2 pulse spacing 22.1 to 30 µs in 0.1 µs steps	_____ (√)
46.	1090 MHz Y P_1 to P_2 pulse spacing 31 µs (±0.1 µs)	_____
47.	1090 MHz Y P_1 to P_2 pulse spacing 29 µs (±0.1 µs)	_____
48.	1090 MHz Y P_1 to P_2 pulse spacing 22.1 µs (±0.1 µs)	_____
49.	1090 MHz Y P_1 to P_2 pulse spacing 37.9 µs (±0.1 µs)	_____

STEP	DATA	RESULT
50.	1090 MHz X P_1 to P_2 pulse spacing 13 µs (±0.1 µs)	_____
51.	1090 MHz X P_1 to P_2 pulse spacing 11 µs (±0.1 µs)	_____
52.	1090 MHz X P_1 to P_2 pulse spacing 7.0 µs (±0.1 µs)	_____
53.	1090 MHz X P_1 to P_2 pulse spacing 19.9 µs (±0.1 µs)	_____
55.	CW frequency output reference	_____(√)
60.	DME Pulse Frequency	_____(√)
61.	Difference between CW and DME Pulse frequencies is <10 kHz	_____
(8)	XPDR/DME Window Width and Positioning	
5.	"F" does not appear on DME-PRF Hz/XPDR-%REPLY Display for accepted 1090 MHz X pulse spacing.	_____(√)
7.	1090 MHz X DME-PRF Hz/XPDR-%REPLY Display indicates pulse spacing below accepted minimum 11.25 µs (±0.1 µs)	_____
10.	1090 MHz X DME-PRF Hz/XPDR-%REPLY Display indicates pulse spacing above accepted maximum 12.75 µs (±0.1 µs)	_____
17.	"F" does not appear on DME-PRF Hz/XPDR-%REPLY Display for accepted 1090 MHz Y pulse spacing.	_____(√)
19.	1090 MHz Y DME-PRF Hz/XPDR-%REPLY Display indicates pulse spacing below accepted minimum 35.25 µs (±0.1 µs)	_____
22.	1090 MHz Y DME-PRF Hz/XPDR-%REPLY Display indicates pulse spacing above accepted maximum 36.75 µs (±0.1 µs)	_____
28.	TP403 is high for invalid pulse spacing.	_____(√)
30.	TP403 is low for accepted 24 µs pulse spacing.	_____(√)
32.	Pulse spacing below accepted minimum 23.25 µs (±0.1 µs)	_____
35.	Pulse spacing above accepted maximum 24.75 µs (±0.1 µs)	_____
44.	Wide 1090 MHz Y pulse spacing below accepted minimum 33.5 µs (±0.4 µs)	_____
47.	Wide 1090 MHz Y pulse spacing above accepted maximum 38.5 µs (±0.4 µs)	_____
48.	TP403 is high for invalid pulse spacing.	_____(√)
51.	Wide pulse spacing below accepted minimum 21.5 µs (±0.4 µs)	_____
54.	Wide pulse spacing above accepted maximum 26.5 µs (±0.4 µs)	_____

STEP	DATA	RESULT
59.	Wide 1090 MHz X pulse spacing below accepted minimum 9.5 µs (±0.4 µs)	_____
62.	Wide 1090 MHz X pulse spacing above accepted maximum 14.5 µs (±0.4 µs)	_____
65.	1090 XPDR DME-PRF Hz/XPDR-%REPLY Display indicates 100% for accepted pulse spacing in reply.	_____(√)
66.	'F' does not appear in XPDR Code display for accepted 1090 XPDR Spacing	_____(√)
68.	1090 XPDR Code Display indicates pulse spacing below accepted minimum 19.9 µs (±0.15 µs)	_____
70.	1090 XPDR Code Display indicates pulse spacing above accepted maximum 20.8 µs (±0.15 µs)	_____
73.	1090 XPDR Narrow Window adjusted to 20.19 uS ±10ns	_____
75.	1090 XPDR Narrow Window adjusted to 40.41 uS ±10ns	_____
(9)	X and Y Channel Range and R-NAV Delay	
5.	8.091269 MHz (±400 Hz)	_____
8.	Oscilloscope displays 36 µs interrogation pulse pair.	_____(√)
	Oscilloscope displays 1090 MHz Y range reply.	_____(√)
	Range reply delay is 56 µs (±247 ns).	_____
11.	Oscilloscope displays 12 µs interrogation pulse pair.	_____(√)
	Oscilloscope displays 1090 MHz X range reply.	_____(√)
	Range reply delay is 50 µs (±247 ns).	_____
12.	1090 MHz X range reply delay (loaded range canceled out by -1 NMi/NORM Switch) is 50 µs (±247 ns).	_____
14.	1090 MHz Y range reply delay (loaded range canceled out by -1 NMi/NORM Switch) is 56 µs (±247 ns).	_____
16.	1090 MHz Y range reply delay with 399 nmi range 4987.2 µs (±0.49 µs)	_____
18.	1090 MHz X range reply delay with 399 nmi range 4981.2 µs (±0.49 µs)	_____
21.	Echo reply delay is 420.8 µs (±12 µs)	_____
23.	1090 MHz X R NAV pulse spacing 50.0 µs (±0.25 µs)	_____
24.	1090 MHz X R NAV pulse widths 7 µs (±1.0 µs)	_____
26.	1090 MHz Y R NAV pulse spacing 56.0 µs (±0.25 µs)	_____
27.	1090 MHz Y R NAV pulse widths 7 µs (±1.0 µs)	_____

STEP	DATA	RESULT
29.	IDENT Tone is 2700 Hz (±0.54 Hz).	_____
32.	Equalizer pulse spacing is 100 µs (±10 µs)	_____
36.	Squitter frequency 2700 Hz (±29 Hz)	_____
38.	PRF/SQTR thumbwheel settings track frequency counter display	_____(√)
(10)	50% Video Slicer and Transmitter Power	
5.	50% video pulse aligns with Gaussian shaped pulse at 50% point	_____(√)
6.	0.75 Vp-p (typical) at 1000 W	_____(√)
9.	50% video pulse is ≥9.5 graticules long	_____
12.	50% video pulse does not oscillate or disappear.	_____(√)
	Slicer quits between 1 and 2 W reading	_____(√)
16.	Pulsed RF Power Source Level reference	_____
18.	XMTR POWER WATTS Display indicates 10x less than Step 16 reading with input power decreased 10 dB.	_____(√)
	XMTR POWER WATTS Display indicates 10x more than Step 16 reading with input power increased 10 dB.	_____(√)
(11)	Discriminator Frequency	
5.	P_1 pulse is displayed.	_____(√)
7.	P_2 pulse is displayed.	_____(√)
10.	F_2 pulse is displayed.	_____(√)
11.	F_2 pulse is displayed between 19.8 (±0.2 µs) and 22 µs (±0.4 µs).	_____(√)
12.	F_1 pulse is displayed.	_____(√)
20.	Frequency displayed on XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.	_____
21.	Frequency displayed on XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.	_____
22.	XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.	_____(√)
23.	XMTR FREQ MHz Display is within ±20 kHz of frequency on DISPLAY SELECT Readout.	_____(√)
25.	XMTR FREQ MHz Display is within ±20 kHz of frequency in Step 21.	_____(√)

STEP	DATA	RESULT
26.	XMTR FREQ MHz Display is within ±20 kHz of frequency in Step 22.	_____(√)
27.	Frequency displayed on XMTR FREQ MHz Display is same as recorded in Step 26.	_____(√)
28.	Frequency displayed on XMTR FREQ Hz Display is within ±50 kHz of frequency displayed in Step 19.	_____(√)
29.	Frequency displayed on XMTR FREQ MHz Display is within ±50 kHz of frequency displayed in Step 19.	_____
31.	Frequency displayed on XMTR FREQ MHz Display is within ±50 kHz of frequency displayed in Step 19.	_____
32.	Frequency displayed on XMTR FREQ MHz Display is within ±50 kHz of frequency displayed in Step 19.	_____
33.	Frequency displayed on XMTR FREQ MHz Display is within ±50 kHz of frequency displayed in Step 19.	_____
35.	dc level displayed	_____
36.	The dc level shifts approximately 1 V from level recorded in Step 35.	_____(√)
37.	The dc level shifts approximately -1 V from level recorded in Step 35.	_____(√)
39.	dc level displayed	_____
40.	The dc level shifts approximately +0.5 V from level recorded in Step 39.	_____(√)
41.	The dc level shifts approximately -0.5 V from level recorded in Step 39.	_____(√)
(12) Parameter Verifications		
3.	Suppressor pulse width 33 µs (±3 µs)	_____(√)
4.	Suppressor minimum pulse amplitude <3 V	_____(√)
5.	Suppressor maximum pulse amplitude >27 V	_____(√)
7.	Leading edge of suppressor pulse is coincident with leading edge of XPDR P_3 pulse	_____(√)
9.	Leading edge of suppressor pulse occurs approximately 3.5 µs before P_1 of range reply pulse	_____(√)
10.	Amplitude (p-p) of generator pulses is approximately 0.5 V into a 50 Ω Load	_____(√)
12.	Verify leading edge of P_1 occurs approximately 20 µs after beginning of Oscilloscope trace.	_____(√)
13.	Leading edge of P_3 occurs at beginning of Oscilloscope trace.	_____(√)

STEP	DATA	RESULT
15.	P_1 of range reply occurs approximately 3.5 µs after beginning of Oscilloscope trace	_____(√)
17.	Pulse spacing between leading edge of first pulse to leading edge of second pulse is 12 µs.	_____(√)
	Spacing between leading edge of second pulse to leading edge of third pulse is 18 µs.	_____(√)
31.	999.95 to 1000.05 Hz (±0.005%)	_____(√)
47.	>10 seconds per channel	_____(√)
49.	<2 seconds per channel	_____(√)