*TB 9-6625-2089-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TEST SET, TRANSPONDER SET AN/APM-305(A) (TS-3395(A))

Headquarters, Department of the Army, Washington, DC
5 March 2008

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also send in your comments electronically to our E-mail address: 2028@redstone.army.mil or by fax 256-842-6546/DSN 788-6546. For the World Wide Web use: https://amcom2028.redstone.army.mil. Instructions for sending an electronic 2028 can be found at the back of this manual.

			Paragraph	Page
SECTION	I.	IDENTIFICATION AND DESCRIPTION		
		Test instrument identification	1	2
		Forms, records, and reports	2	2
		Calibration description	3	2
	II.	EQUIPMENT REQUIREMENTS		
		Equipment required	4	5
		Accessories required	5	5
	III.	CALIBRATION PROCESS		
		Preliminary instructions	6	6
		Equipment setup	7	7
		Internal PRF frequency and measurement accuracy	8	8
		Timing marker accuracy	9	11
		Output trigger accuracy	10	11
		Challenge code accuracy	11	13
		ISLS accuracy	12	16
		Suppressor pulse accuracy	13	17
		Mode 4 interface input and output accuracy	14	18
		Mode 4 disparity	15	19

*This bulletin supersedes TB 9-6625-2089-35, dated 11 December 1987, including all changes.

	Paragraph	Page
SIF reply marker accuracy	16	20
RF output frequency	17	21
Modulator and demodulator accuracy	18	24
RF power output	19	24
RF input power	20	25
RF input frequency	21	28
Power supply	22	29
Final procedure	23	30

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Test Set, Transponder Set, AN/APM-305(A) (TS-3395(A)). TM 11-6625-2611-12 and TM 11-6625-2611-40 were used as the prime data sources in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. None.

b. Time and Technique. The time required for this calibration is approximately 8 hours using the dc and low frequency and microwave technique.

2. Forms, Records, and Reports

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Internal PRF frequency and measurement meter	Range: SIF: 10 to 10,000 pps Mode 4: 5 to 5500 pps Accuracy: Dial: ± 10% Meter: ± 10% at 1/10 meter scale ± 5% at FS
Timing markers	Range: Frequency: 10,000 kHz (10 MHz) Amplitude: 1st level: 1.0 V 2d level: 1.7 V 3d level: 2.5 V into 75Ω Accuracy: Frequency: ± 2 kHz Amplitude: 1st level: ± 0.2 V 2d level: ± 0.2 V 3d level: ± 0.3 V
Scope trigger	Range: Amplitude: 5.0 V Width: 3 µs Risetime: <0.1 µs Falltime: <0.5 µs Variable delay: 0.5 to 4400 µs Accuracy: Amplitude: ± 1.0 V Width: ± 2 µs Variable delay: ± 10%
Auxiliary trigger	Range: Amplitude: 20.0 V Width: 1.0 µs Risetime: <0.1 µs Falltime: <0.2 µs Accuracy: Amplitude: ± 3.0 V Width ± 0.5 µs
Challenge codes	Range: Mode 1: 3.0 µs Mode 2: 5.0 µs Mode 3A: 8.0 µs Mode C: 21.0 µs Test: 6.50 µs Mode 4A: 71 µs Mode 4B: 70 µs Accuracy: Modes 1, 2, 3A, C, and test: ± 0.05 µs Modes 4A and 4B: ± 0.07 µs

Table 1. Calibration Description - Continued

Test instrument parameters	Performance specifications
Challenge sub pulse	Range: ± 0.09 µs Accuracy: ± 0.05 µs Variable: <2 to >4 µs
Challenge pulse width	Range: 0.25, 0.50, 0.80 and 1.70 µs Accuracy: ± 0.05 µs Variable: <0.25 to >1.7µs Risetime: 0.05 to 0.1 µs Falltime: 0.05 to 0.2 µs
ISLS pulse	Range: Spacing: (P1 to P2): 2.0 µs, ± 0.15 and ± 0.60 µs Width: Mode 1: 0.8 µs Mode 4: 0.50 µs Accuracy: ± 0.05 µs Variable: <1.0 to >3.0 µs
Suppressor pulse	Range: Amplitude: 20 V Width: 30 µs Accuracy: Amplitude: ± 2 V Width: ± 3.0 µs Rise and fall time: 20 V/µs or greater
Mode 4 interface input and output	Range: Amplitude: 5.0 V Width: 0.5 µs Spacing: 1.8 µs Delay between input and output: 200 µs Accuracy: Amplitude: ± 0.5 V Width: ± 0.1 µs Spacing: ± 0.1 µs Delay: ± 5.0 µs
Mode 4 disparity	Range: Amplitude: 5.0 V Width: 0.5 µs Accuracy: Amplitude: ± 0.5 V Width: ± 0.1 µs Delay: 65 ± 1 µs after enable trigger or coincident with the pulse at 66 µs
SIF reply marker	Range: Amplitude: 0.5 V minimum Width: 0.15 µs Spacing: 1st to 2d: 20.30 µs 1st to 3d: 24.65 µs 1st to 4th: 49.30 µs Accuracy: Amplitude: Minimum Width: ± 0.05 µs Spacing: ± 0.02 µs

Table 1. Calibration Description - Continued

Test instrument parameters	Performance specifications
Modulator and demodulator	Range: Width: 0.80 µs Risetime: 0.05 to 0.10 µs Falltime: 0.05 to 0.20 µs Accuracy: ± 0.02 µs of recorded inputs
RF input power	Range: +18 dBW to +33 dBW Accuracy: ± 1.0 dBW
RF input frequency	Range: 1070 to 1110 MHz Accuracy: 1087 to 1093 MHz, ± 0.2 MHz, all others ± 0.6 MHz
RF output frequency	Range: 1030 MHz fixed, 1030 SWP ±5 MHz; 1030 SWP ± 20 MHz Accuracy: 1030 MHz fixed and 1030 SWP ± 5 MHz ± 0.1 MHz; 1030 SWP ± 20 MHz ± 0.3 MHz
RF output power	Range: -10 dBm Accuracy: ± 1 dBm

SECTION II
EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-287, and AN/GSM-705. Alternate items may be used by the calibrating activity when the equipment listed in table 2 is not available. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio -between the standard and TI. Where the four-to-one ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

5. Accessories Required. The accessories required for this calibration are common usage accessories issued as indicated in paragraph **4** above and are not listed in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
AUTOTRANSFORMER	Range: 105 to 125 V	Ridge, Model 9020A (9020A)
DIRECTIONAL COUPLER	Range: 7.0-12.4 GHz	Narda, Model 3095 (3095)
FREQUENCY COUNTER	Range: 13.5 Hz to 1200 MHz Accuracy: ± 0.0005%	Fluke, Model PM6681/656 (PM6681/656)
MULTIMETER	Range: -12.25 to +28.25 V dc Accuracy: 0.025%	Agilent, Model 3458A (3458A)
OSCILLOSCOPE	Range: Dc to 50 MHz Accuracy: ± 3%	Agilent, OS-303/G (OS-303/G)

Table 2. Minimum Specifications of Equipment Required - Continued

Common name	Minimum use specifications	Manufacturer and model (part number)
PEAK POWER METER	Range: 18 to 33 dBm	Gigatronics, Model 8502A w/sensor 16934 (8902A))
POWER METER	Range: -10 to -20 dBm Accuracy: ± 0.25 dBm	Agilent, Model 437B (13440045) w/power sensor Agilent, Model 8481 or 8482A (13440043)
PULSE GENERATOR	Pulse width: 0.5 µs Amplitude: 4.5 to 5.0 V	LeCroy, Model 9210MOD200 (9210MOD200) w/plug-ins, LeCroy, Models 9211 (9211) and 9215 (9215) (MIS 45839)
SEMICONDUCTOR DEVICE (CRYSTAL DETECTOR)	Range: 1010 to 1050 MHz	Agilent, Model 423AOPT03 (423AOPT03)
SIGNAL GENERATOR	Range: 1000 to 1100 MHz Power pulse output: 0.5 to 5.0 kW	Narda, Model 18500B
SYNTHESIZED SIGNAL GENERATOR	Range: 1010 to 1050 MHz	Anritsu, Model 68369NV (68369NV)
VARIABLE ATTENUATOR NO. 1	Range: 0 to 30 dB	Weinschel, Model AF1171A-69-34 (AF117A-69-34)
VARIABLE ATTENUATOR NO. 2	Range: 5 to 90 dB	Narda, Model 2936

SECTION III
CALIBRATION PROCESS

6. Preliminary Instructions

a. The instructions outlined in paragraphs **6** and **7** are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name and item identification number as listed in table 2.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Additional maintenance information is contained In TM 11-6625-2611-12 and TM 11-6625-2611-40 for this TI.

d. When indications specified in paragraphs **8** through **21** are not within tolerance, perform the power supply check prior to making adjustments. After adjustments are made, repeat paragraphs **8** through **21**. Do not perform power supply check if all other parameters are within tolerance.

e. Unless otherwise specified, all controls and control settings refer to the TI.

7. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions. REDUCE OUTPUT(S) to minimum after each step within the performance check where applicable.

a. Remove TI protective cover as required for adjustment.

b. Connect TI to autotransformer (A1).

c. Connect autotransformer to a 115 V output.

d. Position **POWER** switch to **ON** and allow at least 1 hour for equipment to warm-up and stabilize.

e. Position controls as listed in (1) through (25) below:

(1) **MEASUREMENT PRF RANGE** switch to **X1K**.

(2) **MEASUREMENT FUNCTION SELECT** switch to **PRF CHAL**.

(3) **MEASUREMENT DEMOD VID LEVEL** control to midrange.

(4) **MEASUREMENT MKR PHASING** control to midrange.

(5) **CHAL SUB PULSE SELECT** switch to **SIFP1**.

(6) **CHAL SUB PULSE POSITION SELECT** switch to **0**.

(7) **CHAL SUB PULSE POSITION VARY** control to midrange.

(8) **CHAL MODE SELECT** switch to **1**.

(9) **CHAL WIDTH SELECT** switch to **0.80**.

(10) **CHAL WIDTH VARY** control to midrange.

(11) **CHAL ISLS SPACING SELECT** switch to **0**.

(12) **CHAL ISLS SPACING VARY** control to midrange

(13) **CHAL INHIB** switch to **OFF**.

(14) **CHAL AUX MOD DLY** control fully ccw.

(15) **PRF SELECT RANGE** switch to **X1K**.

(16) **PRF SELECT MULT** control to **5.0**.

(17) **PRF SELECT** switch to **X1**.

(18) **SCOPE TRIG/FREQ MEAS DELAY (μSEC) RANGE** switch to **OFF**.

(19) **SCOPE TRIG/FREQ MEAS DELAY (μSEC) MULT** control to **5.0**.

(20) **SUPPR** switch to **ON**.

(21) **AUX TRIG** switch to **ON**.

(22) **MAIN ATTN** control to **-10**.

(23) **AUX ATTEN** control to **-10**.

(24) **RF IN/OUT DEMOD** switch to **DEMOD MAIN**.

(25) **SIG GEN FUNCTION** switch to **FIXED FREQ**.

NOTE

Termination must be installed on **LOW PWR IN** jack when signal under test is not being applied to **LOW PWR IN** jack for proper receiver operation.

NOTE

MEASUREMENT METER ZERO adjust (on front panel) should only be adjusted when TI is deenergized. Do not adjust during calibration procedure.

8. Internal PRF Frequency and Measurement Accuracy

a. Performance Check

(1) Connect **RF IN/OUT MAIN** to **LOW PWR IN** and connect frequency counter to **SCOPE TRIG OUT**.

(2) Adjust **PRF SELECT MULT** control to 1.00. If frequency counter does not indicate between 900 and 1100 Hz, perform **b** (1) below.

(3) Position controls as indicated in table 3. If frequency counter does not indicate within limits specified, perform corresponding adjustments in table 3.

Table 3. Internal PRF Frequency Accuracy

Test instrument **PRF SELECT** control settings		Frequency counter indications (Hz)		Adjustments (fig. 1) (R)
RANGE	**MULT**	Min	Max	
X1K	10.00	9000	11000	A1R3 for 10000 Hz
X100	10.00	900	1100	- - -
X100	1.00	90	110	A1R14 for 100 Hz
X10	1.00	9	11	- - -
X10	10.00	90	110	A1R19 for 100 Hz

(4) Set **MEASUREMENT PRF RANGE** switch to **X10** and **PRF SELECT MULT** control for a measurement meter indication of **1.5**. Frequency counter will indicate between 13.5 and 16.5 Hz.

(5) Position controls as listed in table 4. If frequency counter does not indicate within limits specified, perform adjustments in table 4.

Table 4. PRF Measurement Accuracy

Test instrument			Frequency counter indications (Hz)		Adjustments (fig. 1) (R)
Measurement **PRF RANGE**	**PRF SELECT RANGE**	Measurement meter indications			
X10	X10	10.0	Min	Max	A10R24 for 100 Hz
X100	- - -	1.0	95	105	- - -
X100	X100	10.0	90	110	A10R20 for 1000 Hz
X1K	- - -	1.0	950	1050	- - -
X1K[1]	X1K	10.0	900	1100	A10R16 for 10,000 Hz
X10	X10	10.0	9500	10,500	A10R24 for 100 Hz

[1]If measurement meter does not indicate full scale, perform **b** (2) and (3) below.

(6) Set **MEASUREMENT FUNCTION SELECT** switch to **PRF REPLY**. Measurement meter will indicate 10.0.

b. Adjustments

(1) Adjust A1R9 (fig. 1) for a frequency counter indication of 1000 Hz (R).

(2) Connect oscilloscope to A10TP3. Adjust **PRF SELECT MULT** control until frequency counter indicates 5000 Hz.

(3) Adjust A10R27 (fig. 1) for a pulse width of 99.0 μs as indicated on oscilloscope (R).

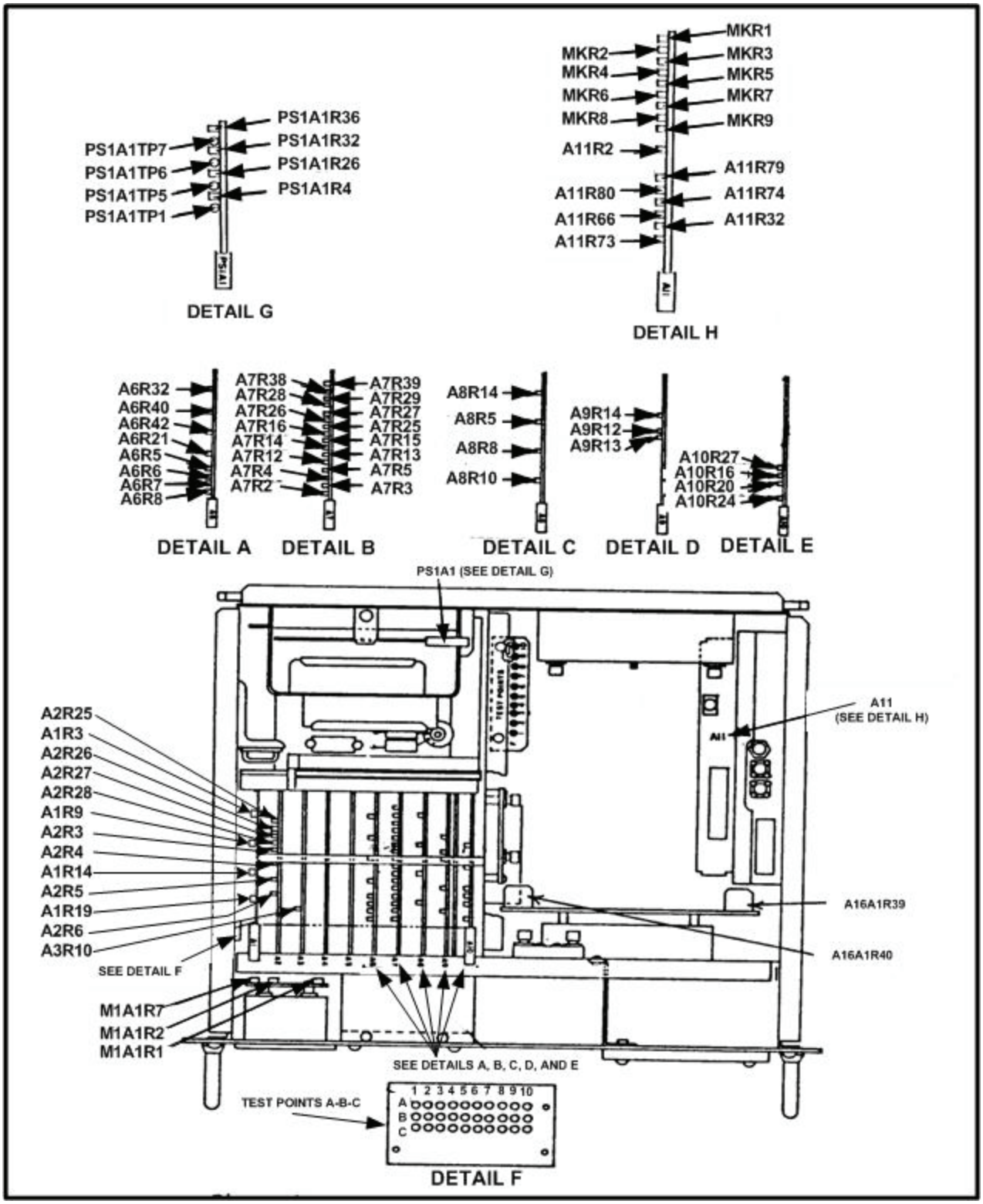

Figure 1. Test point and adjustment locations.

9. Timing Marker Accuracy

a. Performance Check

(1) Connect **TIMING MKRS** out to frequency counter input, using 50 Ω termination.

(2) Position controls as listed in paragraph **7 e** above.

(3) Frequency counter will indicate 10.000 ±0.002 MHz.

(4) Disconnect cable and termination from frequency counter channel A. Connect cable and termination to oscilloscope **CH1** input.

(5) Connect **SCOPE TRIG OUT** to oscilloscope **AUX TRIG IN**, using 93 Ω cable.

(6) Adjust oscilloscope controls as necessary to display a series of three pulses of different amplitudes.

(7) Measure time between leading edge of first and second pulses with greatest amplitude. If the time is not 10 μs and the pulse amplitudes are not between 2.2 and 2.8 V, perform **b** (1) below.

(8) Repeat technique of (7) above for pulses with second greatest amplitude. If the time is not 1.0 μs and the pulse amplitudes are not between 1.5 and 1.9 V, perform **b** (2) below.

(9) Repeat technique of (7) above for pulses with third greatest amplitude. If time is not 0.1 μs and the pulse amplitudes are not between 0.8 and 1.2 V, perform **b** (3) below.

b. Adjustments

(1) Adjust A9R12 (fig. 1) for a pulse amplitude of 2.5 V as indicated on oscilloscope (R).

(2) Adjust A9R13 (fig. 1) for a pulse amplitude of 1.7 V as indicated on oscilloscope (R).

(3) Adjust A9R14 (fig. 1) for a pulse amplitude of 1.0 V as indicated on oscilloscope (R).

10. Output Trigger Accuracy

a. Performance Check

(1) Connect **SCOPE TRIG OUT** to oscilloscope **CH1** input, using 93 Ω cable 93 Ω and termination. Connect **AUX TRIG OUT** to oscilloscope **AUX TRIG IN**, using 93 Ω cable.

(2) Set **PRF SELECT RANGE** switch to **X1K** and **PRF SELECT MULT** control to 1.0. Oscilloscope will display a pulse with an amplitude between 4.0 and 6.0 V and a width of 1.0 to 5.0 μs**.**

(3) Set **SCOPE TRIG/FREQ MEAS DELAY (μSEC) RANGE** switch to **X0.4** and **PRF SELECT MULT** control to **10.0**.

(4) Measure risetime and falltime using standard measurement techniques. Risetime will be less than 0.1 μs and falltime will be less than 0.5 μs.

(5) Reverse the cable connections at the TI **SCOPE TRIG OUT** and **AUX TRIG OUT**.

(6) Adjust oscilloscope controls as required for a pulse display centered on CRT. A pulse amplitude of 17 to 23 V with a pulse width of 0.5 to 1.5 μs will be displayed on oscilloscope.

(7) Measure risetime and falltime using standard measurement techniques. Risetime will be less than 0.1 μs and falltime will be less than 0.2 μs.

(8) Set **SCOPE TRIG/FREQ MEAS DELAY (μSEC) RANGE** switch to **OFF**.

(9) Connect oscilloscope **CH2** input to TPA5 (fig. 1) using X10 probe.

(10) Measure delay between leading edge of signals on oscilloscope **CH2** and **CH1** inputs. Delay will be between 3.0 and 5.0 μs.

(11) Disconnect probe from TPA5.

(12) Position controls as listed in (a) through (c) below:

(a) **SIG GEN FUNCTION** switch to **SWP ±5MHz**.
(b) **SCOPE TRIG/FREQ MEA DELAY (μSEC) RANGE** switch to **X4**.
(c) **SCOPE TRIG/FREQ MEA DELAY (μSEC) MULT** control to **1.0**.

(13) Connect oscilloscope **CH2** input to TPA2 (fig. 1) using X1 probe. Leading edge of pulse on **CH 1** will be 0.5 μs or less from trailing edge of pulse on **CH2**.

(14) Set **AUX TRIG** switch to **OFF.** Pulse on **CH1** will disappear. Set **AUX TRIG** switch to **ON**.

(15) Set **SIG GEN FUNCTION** switch to **FIXED FREQ** and reverse **MEASUREMENT SCOPE TRIG OUT** and **AUX TRIG OUT** connections on TI.

(16) Adjust **SCOPE TRIG/FREQ MEAS DELAY (USEC) MULT** control to 1.0 and **SCOPE TRIG/FREQ MEAS DELAY (USEC) RANGE** switch to **X0.4**.

(17) Measure delay between leading edge of signals on oscilloscope **CH1** and **CH2** inputs. Delay will be between 0.3 and 0.5 μs.

(18) Position controls as listed in table 5. Delay as measured on oscilloscope will be within limits specified, if not, perform adjustments as listed in table 5.

Table 5. Output Trigger Accuracy

PRF SELECT RANGE	**SCOPE TRI/FREQ** measurement delay (USEC)		Oscilloscope indications delay (μS)		Adjustments (fig. 1) (R)
	Range	Mult	Min	Max	
- - -	- - -	11.0	4.0	4.8	A2R6
- - -	X4	- - -	40	48	A2R5
- - -	- - -	1.0	3.6	4.4	A2R27
- - -	X40	- - -	36	44	A2R26
X100	- - -	11.0	400	480	A2R4
- - -	X400	- - -	4000	4800	A2R3
- - -	- - -	1.0	360	440	A2R25

(19) Set **SCOPE TRIG/FREQ MEASUREMENT DELAY (μSEC) RANGE** switch to **X400** and **SCOPE TRIG/FREQ MEASUREMENT DELAY (μSEC) MULT** control to 10.0.

(20) Measure jitter of pulse on oscilloscope **CH1**. Jitter will be less than 0.41 µs**.**

(21) Position controls as listed in (a) through (c) below:

(a) **PRF SELECT RANGE** switch to **X1K**.
(b) **SCOPE TRIG/FREQ MEASUREMENT DELAY (µSEC) RANGE** switch to **X0.4**.
(c) **SCOPE TRIG/FREQ MEASUREMENT DELAY (µSEC) MULT** switch to **1.25**.

(22) Measure jitter of pulse on oscilloscope **CH1**. Jitter will be less than 0.01 µs.

b. Adjustments. No further adjustments can be made.

11. Challenge Code Accuracy

a. Performance Check

(1) Connect equipment as shown in figure 2.

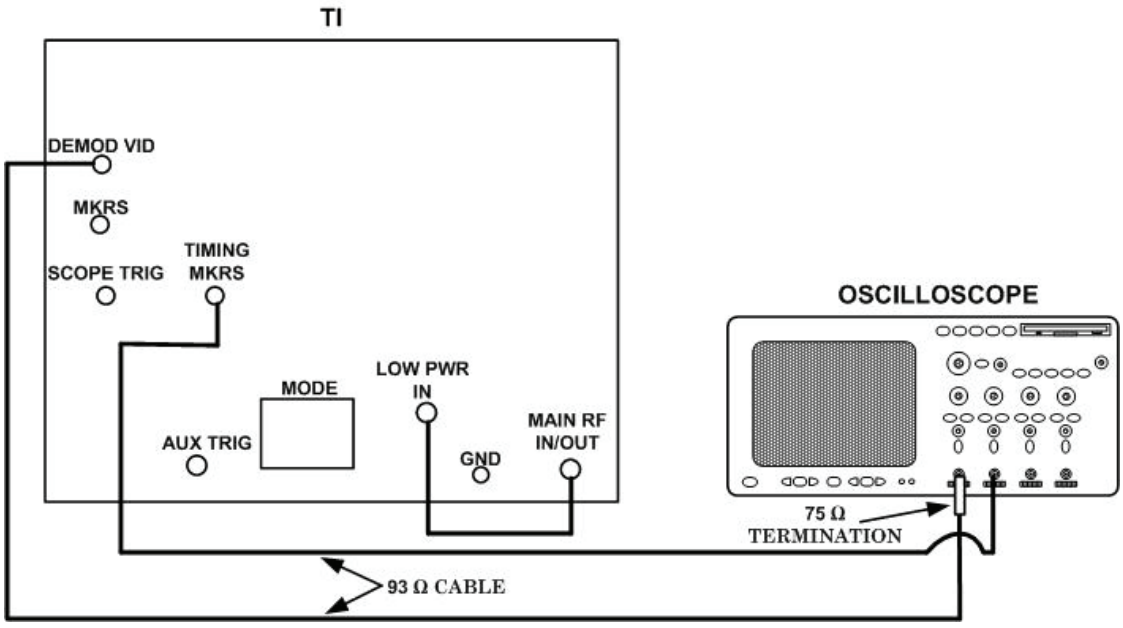

Figure 2. Challenge code - equipment setup.

(2) Position controls as listed in paragraph **7 e**.

(3) Adjust oscilloscope controls as required to observe two pulses on **CH1** and timing markers on **CH2**.

(4) Adjust oscilloscope **CH1** and **CH2** position controls so that a peak of 0.1 µs marker (**CH2** input) intersects leading edge of **CH1** input pulse.

(5) Adjust oscilloscope controls as required to display second pulse and count the number of markers to same reference point on the leading edge of second **CH1** input pulse. Multiply number of markers by 0.1 µs to obtain pulse spacing. Pulse spacing will be between 2.95 and 3.05 µs.

(6) Repeat technique of (3) through (5) above for control settings listed in table 6. If pulse spacing as indicated on oscilloscope is not within limits specified, perform adjustments listed in table 6.

Table 6. Challenge Code Accuracy

Test instrument		Oscilloscope indications spacing (μS)		Adjustments (fig. 1) (R) (μS)
CHAL MODE SELECT	**CHAL SUB PULSE POSITION SELECT**	Min	Max	
1	-.9	3.85	3.95	A6R5 for 3.9
1	-.2	3.15	3.25	A6R6 for 3.2
1	+.2	2.75	2.85	A6R7 for 2.8
1	+.9	2.05	2.15	A6R8 for 2.1
1	VARY`	<2.0[1]	>4.0[2]	- - -
2	+.9	4.05	4.15	- - -
2	0	4.95	5.05	- - -
3/A	0	7.95	8.05	- - -
3/A	+.9	7.05	7.15	- - -
C	+.9	20.05	20.15	- - -
C	0	20.95	21.05	- - -
TEST	0	6.45	6.55	A6R21 for 6.5
TEST	+.9	5.55	5.65	- - -

[1]Adjust **VARY** control fully cw.
[2]Adjust **VARY** control fully ccw.

(7) Position switches as listed in (a) through (c) below:

(a) **CHAL MODE SELECT** to **4A**.
(b) **CHAL WIDTH SELECT** to **0.50**.
(c) **PRF SELECT** to **X1/2**.

(8) Oscilloscope **CH1** will display a pulse train (Challenge Word) consisting of 28 pulses.

(9) Set **CHAL, SUB PULSE SELECT** switch to **M4P2** and observe second pulse of train. Second pulse of train will move out of position.

(10) Set **CHAL SUB PULSE SELECT** switches to **M4P3**. Second pulse of train will return to original position and third pulse of train will move out of position.

(11) Set **CHAL SUB PULSE SELECT** switch to **M4P4**. Third pulse of train will return to original position and fourth pulse of train will move out of position.

(12) Set **CHAL SUB PULSE POSITION SELECT** switch to **0**. Adjust oscilloscope controls until twenty-eight pulses are displayed on oscilloscope crt. Using technique of (3) through (5) above, verify that pulses are present at 0, 2, 4, 6, 10, 13, 15, 17, 20, 24, 26, 30, 33, 35, 38, 41, 43, 45, 48, 50, 52, 54, 58, 61, 63, 66, 68, and 71 μs positions.

(13) Using technique of (2) through (4) above, measure pulse spacing between first and last pulse. Pulse spacing will be between 70.93 and 71.07 μs.

(14) Set **CHAL MODE SELECT** switch to **4B**. Using technique of (2) through (4) above, verify that twenty-eight pulses are present in challenge word, at 0, 2, 4, 6, 10, 12, 15, 17, 19, 22, 25, 28, 30, 32, 35, 37, 40, 44, 48, 51, 53, 55, 57, 60, 62, 64, 66, and 70 μs position.

(15) Using technique of (2) through (4) above measure pulse spacing between first and last pulse. Pulse spacing will be between 69.93 and 70.07 μs.

(16) Position switches as listed in (a) through (c) below:

(a) **CHAL MODE SELECT** to **1**.
(b) **CHAL WIDTH SELECT** to **0.80**.
(c) **PRF SELECT** to **X1**.

(17) Adjust oscilloscope controls to position intensified trace over second challenge pulse, using 0.1 μs markers on **CH 2**, measure pulse width of 50% amplitude point. Pulse width will be between 0.75 and 0.85 μs, if not, perform **b** (1) below.

(18) Measure risetime between 1 and 81 percent amplitude points. Risetime will be between 0.05 and 0.1 μs.

(19) Measure falltime using technique in (19) above. Falltime will be between 0.05 and 0.2 μs.

(20) Position controls as listed in table 7. Measure pulse width using technique in (18) above. Pulse width will be as specified, if not, perform appropriate adjustment as listed in table 7.

Table 7. Challenge Width Accuracy

Test instrument **CHAL WIDTH SELECT**	Oscilloscope indications (μS)		Adjustments (fig. 1) (R)	
	Max	Min	Main	Aux
0.25	0.20	0.30	A7R13	A7R2 for 0.25 μs
0.50	0.45	0.55	A7R14	A7R3 for 0.50 μs
1.70	1.65	1.75	A7R16	A7R5 for 1.70 μs
VARY	<0.25[1]	>1.7[2]	- - -	- - -

[1]Adjust **VARY** control fully ccw.
[2]Adjust **VARY** control fully cw.

(21) Connect **LOW PWR IN** to **AUX RF IN/OUT** and connect **CH1** of oscilloscope to TPB3 (fig. 1) using X10 probe.

(22) Set **CHAL WIDTH SELECT** switch to 0.80 and repeat (18) through (21) above for **AUX** channel. Results will be as specified in (18) through (21) and table 8 for each measurement. If not, perform appropriate adjustment as indicated for the **AUX** channel.

(23) Connect oscilloscope **CH1** to TPB4 using X1 probe and 75 Ω termination. Connect oscilloscope **CH2** to TPB3 (fig. 1) using X1 probe and 75 Ω termination.

(24) Position **CHAL AUX MOD DLY** control to 0.2 μs. Measure delay from leading edge of first **CH2** input pulse to leading edge of first **CH1** input pulse. Delay will be between 0.15 and 0.25 μs**,** if not perform **b** (2) below.

(25) Adjust **CHAL AUX MOD DLY** control fully ccw. Delay will be 0.05 μsec or less.

(26) Adjust **CHAL AUX MOD DLY** control fully cw. Delay will be 0.4 μsec or greater.

b. Adjustments

(1) Adjust A7R15 (main) (A7R4-AUX) for 0.80 μs (R).

(2) Position **CHAL AUX MODE DLY** control to detent and loosen set screws. Adjust set screw center of knob to 0.2 μs as indicated on oscilloscope. Retighten set screws in knob.

12. ISLS Accuracy

a. Performance Check

(1) Connect equipment as shown in figure 2.

(2) Position switches as listed in (a) through (c) below:

(a) **CHAL INHIBIT** to **ISLS ON**.
(b) **MEASUREMENT FUNCTION SELECT** to **PRF CHAL**.
(c) **CHAL WIDTH SELECT** to **0.25**.

(3) Oscilloscope **CH1** will display three pulses. Measure pulse spacing from leading edge of first pulse to leading edge of second pulse, using timing markers on **CH2** as a reference. If pulse spacing is not between 1.95 and 2.05 μs, perform **b** (1) below.

(4) Adjust oscilloscope controls as necessary to measure width of second pulse at the 50 percent amplitude point, using the 0.1 μs markers. If pulse width is not between 0.75 to 0.85 μs, perform **b** (2) below.

(5) Set **CHAL MODE SELECT** switch to **4A** and **PRF SELECT** switch to **X½**. Adjust oscilloscope controls as necessary to display 29 pulses. Measure pulse width of fifth pulse at 50 percent amplitude point, using 0.1 μs markers. If pulse width is not between 0.45 and 0.55 μs perform **b** (3) below.

(6) Using technique of (3) above, measure pulse spacing from leading edge of first to fifth pulse. Pulse spacing will be between 7.93 and 8.07 μs.

(7) Vary **AUX ATTEN** control while observing oscilloscope, only the fifth pulse will vary in amplitude

(8) Set **CHAL ISLS SPACING SELECT** switch to **-.60** and **CHAL MODE SELECT** switch to **1**. Using technique of (3) above, measure pulse spacing from leading edge of first pulse to leading edge of second pulse. If pulse spacing is not between 1.35 and 1.45 μs, perform **b** (4) below.

(9) Position controls as listed in table 8. Pulse spacing as indicated on oscilloscope will be within limits specified in table 8, if not, perform appropriate adjustments.

Table 8. Challenge ISLS Spacing Accuracy

Test instrument **CHAL ISLS SPACING SELECT**	Oscilloscope indications (μS)		Adjustments (fig. 1) (R) (μS)
	Min	Max	
-.15	1.80	1.90	A7R26 for 1.85
+.15	2.10	2.20	A7R28 for 2.15
+.60	2.55	2.65	A7R29 for 2.60
VARY	<1.0[1]	>3.0[2]	- - -

[1]Adjust **VARY** control fully ccw.
[2]Adjust **VARY** control fully cw.

(10) Disconnect cable from **MAIN RF IN/OUT** jack and connect to **AUX RF** jack. No pulses will be present on CH1 of oscilloscope.

(11) Set **CHAL INHIBIT** switch to **OFF**. Two pulses will be present on **CH1** of oscilloscope.

b. Adjustments

(1) Adjust A7R27 (fig. 1) for 2.0 μs (R).

(2) Adjust A7R39 (fig. 1) for .80 μs (R).

(3) Adjust A7R38 (fig. 1) for 0.5 μs (R).

(4) Adjust A7R25 (fig.. 1) for 1.4 μs (R).

13. Suppressor Pulse Accuracy

a. Performance Check

(1) Connect **SUPPR OUT** to oscilloscope **CH1** input using 93 Ω cable. Connect oscilloscope **CH2** input to TPA5 (fig. 1), using X10 probe.

(2) Measure amplitude of pulse on oscilloscope **CH1** input. Pulse amplitude will indicate between 18 and 22 V.

(3) Measure width of pulse on oscilloscope **CH1** input. Pulse width will be between 27 and 33 μs at 50 percent if not perform **b** below.

(4) Measure and note oscilloscope **CH1** input pulse time duration between 10 and 90 percent amplitude points for use in (7) below.

(5) Measure and note oscilloscope **CH1** input pulse amplitude between 10 and 90 percent points for use in (7) below.

(6) Divide measurement in (5) above by measurement in (4) above to obtain pulse risetime in V/μs. Pulse risetime will be 20 V/μs or greater.

(7) Measure falltime, using technique in (5) through (6) above. Falltime will be 20 V/μs or greater.

(8) Measure spacing between leading edges of pulses on oscilloscope **CH1** and **CH2** input. Pulse spacing will be less than 1.0 μs.

(9) Set **SUPPR** switch to **OFF**. Pulse on oscilloscope **CH1** input will disappear.

b. Adjustments. Adjust A3R10 (fig. 1) for 30 μs (R).

14. Mode 4 Interface Input and Output Accuracy

a. Performance Check

(1) Connect equipment as shown in figure 3.

(2) Set pulse generator for a positive pulse of **1.5 V** at **500 Hz** and a pulse width of **0.5 μs**.

(3) Set oscilloscope to display **CH1** and **CH2** and measure spacing between leading edges of pulse on **CH2** input and first pulse on **CH1** input. Pulse spacing will be between 195 and 205 μs, if not perform **b** (1) below.

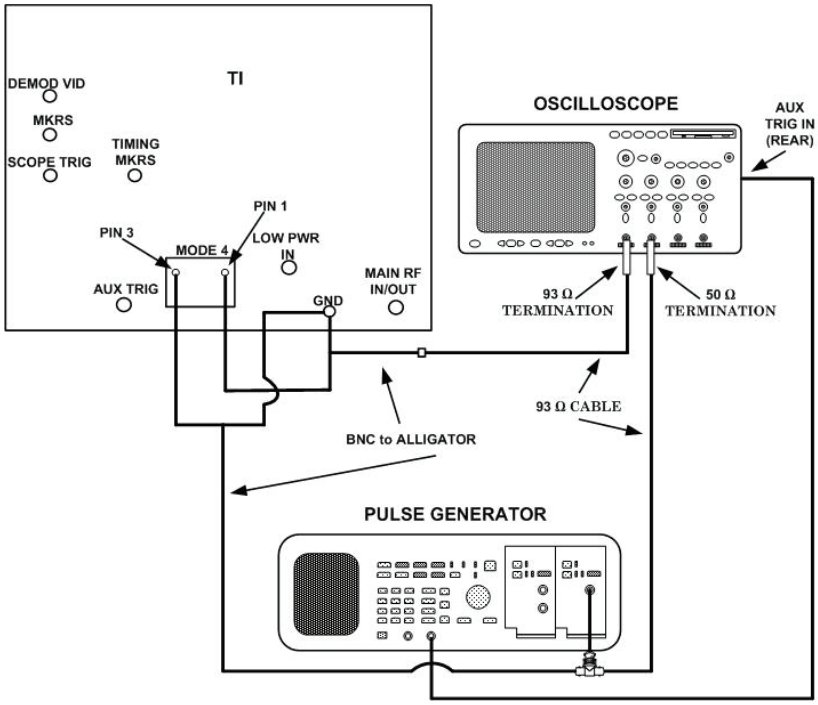

Figure 3. Mode 4 interface input and output - equipment setup.

(4) Measure pulse width of first pulse on **CH1** input at 50 percent of pulse amplitude. Pulse width will be between 0.4 and 0.6 μs, if not perform **b** (2) below.

(5) Measure pulse amplitude. Pulse amplitude will be between 4.5 and 5.5. V.

(6) Measure spacing between first and second pulses leading edge to leading edge. Pulse will be between 1.7 and 1.9 μs, if not perform **b** (3) below.

(7) Set **CHAL INHIBIT** switch to **ISLS ON** and observe pulses on **CH1** input are inhibited.

(8) Set **CHAL INHIBIT** switch to **DISPARITY (MOM)** and observe that pulses on CH1 input are inhibited.

(9) Set **CHAL INHIBIT** switch to **OFF** and disconnect cable from pulse generator pulse out jack. Observe that three pulse reply disappears from **CH1** input.

(10) Set **CHAL MODE SELECT** switch to **4A** and **PRF SELECT** switch to **X½**. Press **BIT (MOM)** pushbutton, observe that three pulse reply is present.

b. Adjustments

(1) Adjust A8R5 (fig. 1) or 200 µs (R).

(2) Adjust A8R8 (fig. 1) for 0.5 µs (R).

(3) Adjust A8R10 (fig. 1) for 1.8 µs (R).

15. Mode 4 Disparity

a. Performance Check

(1) Connect equipment as shown in figure 4.

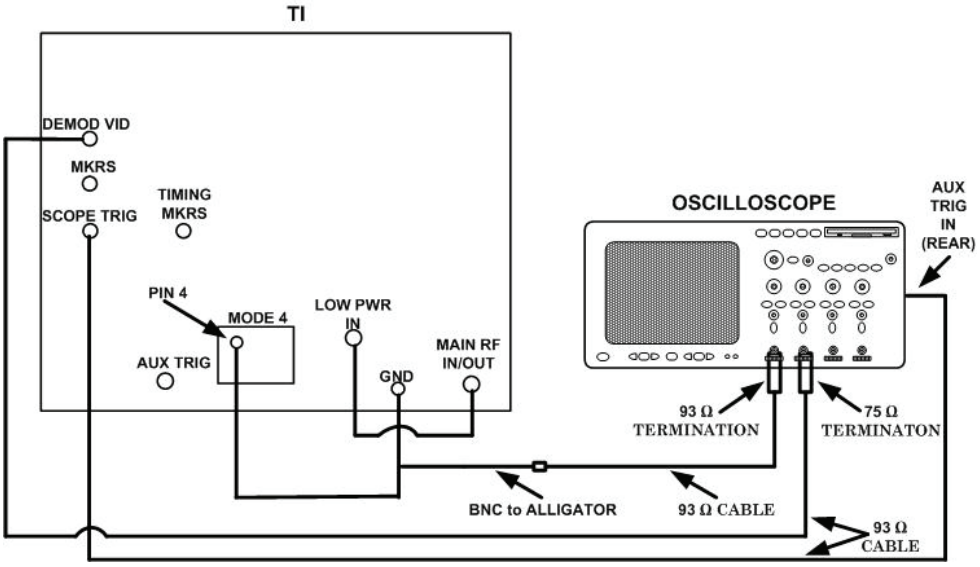

Figure 4. Mode 4 disparity - equipment setup.

(2) Position switches as listed in (a) through (c) below:

(a) **CHAL WIDTH SELECT** to **0.50**.
(b) **CHAL MODE SELECT** to **4A**.
(c) **PRF SELECT** to **X½**.

(3) Position and hold **CHAL INHIBIT** switch to **DISPARITY (MOM)**. Observe pulse in 66 µs position (26th pulse) of mode 4 challenger word. Observe that pulse in 66 µs position (26th pulse) is inhibited and transfers from oscilloscope **CH2** input to oscilloscope **CH1** input.

(4) Set **CHAL INHIBIT** switch to **ISLS ON**. Press and hold **BIT (MOM)** pushbutton. Adjust oscilloscope to center last pulse on **CH2** input on crt graticule. Measure spacing between last pulse on oscilloscope **CH2** input and pulse on oscilloscope **CH1** input. Pulse on oscilloscope **CH1** input will be within ±1 µs of last pulse on oscilloscope **CH2** leading edge, if not perform **b** below.

(5) Measure amplitude of pulse on **CH1** input while pressing **BIT (MOM)** pushbutton, pulse amplitude will be between 4.5 and 5.5 V.

(6) Measure width of pulse on oscilloscope **CH1** input while pressing **BIT (MOM)** pushbutton, pulse width will be between 0.4 and 0.6 μs.

b. Adjustments. Adjust A8R14 (fig. 1) until the pulses are within 0.1 μs of each other (R).

16. SIF Reply Marker Accuracy

a. Performance Check

(1) Set controls as listed in paragraph **7 e**.

(2) Connect equipment as shown in figure 5.

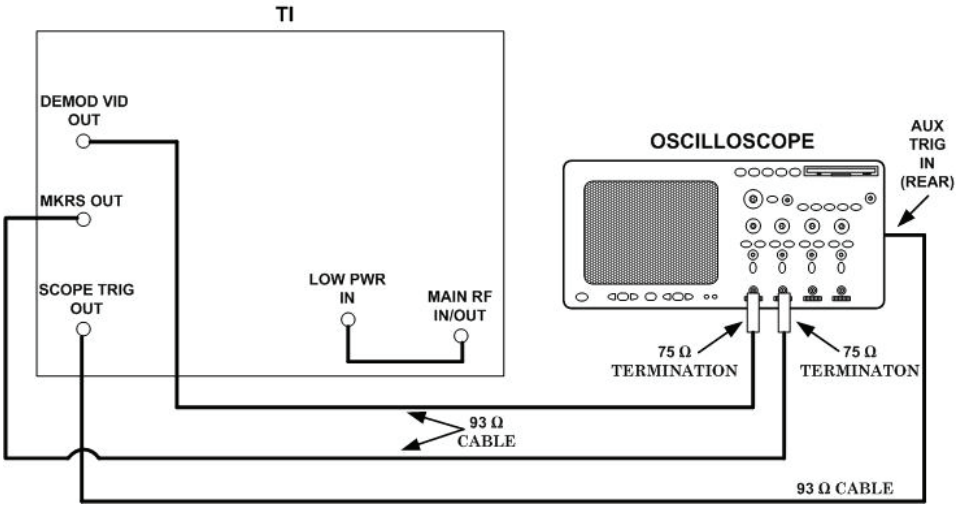

Figure 5. SIF reply marker - equipment setup.

(3) Four markers will occur on oscilloscope **CH2** input starting 2 to 4 μs after second pulse on **CH1** input.

(4) Adjust oscilloscope controls to view second pulse on **CH1** input and first pulse on **CH2** input. Vary **MKR PHASING** control throughout entire range and measure spacing between second pulse on **CH1** input and first pulse on **CH2** input. Pulse spacing will vary from less than 2 μs to more than 4 μs.

(5) Measure pulse amplitude and width of first pulse on oscilloscope **CH2** input. Pulse amplitude will be a minimum of 0.5 V and pulse width will be between 0.10 and 0.20 μs.

(6) Disconnect cable from **DEMOD VID OUT** and connect 93 Ω cable from **TIMING MKRS OUT** to oscilloscope **CH1** input. Determine spacing between leading edge of first and second pulse as listed in (7) through (9) below.

(7) Position oscilloscope controls as listed in (a) through (c) below:

(a) Horizontal controls to view first **CH2** pulse on display.

(b) **DELAYED** pushbutton pressed and intensified trace centered on first **CH2** pulse.

(c) **CH1** and **CH2** controls to align a 1 μs marker on **CH1** input to the leading edge of **CH2** input pulse.

(8) Adjust **DELAYED** controls to display second pulse and count the number of markers to the reference point on leading edge of the second **CH2** input pulse. Multiply the count by 1 μs for measurements.

(9) Align 19 μs marker to a reference point on CRT graticule and count 0.1 μs markers from 19 μs reference point to leading edge of second **CH2** input pulse. Multiply this count by 0.1 μs and add to 19 μs to obtain pulse spacing. If pulse spacing is not between 20.28 and 20.32 μs, perform **b** (1) below.

(10) Measure pulse spacing between first and third pulses, using technique in (7) through (9) above using 24th μs marker as a reference. If pulse spacing is not between 24.63 and 24.67 μs, perform **b** (2) below.

(11) Measure pulse spacing between first and fourth pulses using 48th μs marker as reference. If pulse spacing is not between 49.28 and 49.32 μs, perform **b** (3) below.

b. Adjustments

(1) Adjust A6R32 (fig. 1) for a pulse spacing of 20.30 μs (R).

(2) Adjust A6R40 (fig. 1) for a pulse spacing of 24.65 μs (R).

(3) Adjust A6R42 (fig. 1) for a pulse spacing of 49.30 μs (R).

17. RF Output Frequency

a. Performance Check

(1) Connect **MAIN RF IN/OUT** to input of frequency counter.

(2) Set **CHAL MODE SELECT** switch to **CW**. Frequency counter will indicate 1.0300 ±0.0001 GHz.

(3) Set **SIG GEN FUNCTION** switch to **SWP ±5 MHz** and connect equipment as shown in figure 6.

(4) Oscilloscope **CH1** will display 1025 to 1035 MHz markers as shown in figure 7, 1010 and 1050 MHz markers will not be present.

(5) Set synthesized signal generator output frequency to approximately 1025 MHz and adjust the output level controls until a birdie is present on oscilloscope **CH2** display.

(6) Adjust synthesized signal generator frequency controls until birdie is aligned with leading edge of first (1025 MHz) marker on **CH1** of oscilloscope. Frequency counter will indicate 1.0250 ±0.0001 GHz, if not perform **b** (1) below.

(7) Repeat technique of (6) above for TI markers listed in table 9. If indications are not within limits specified, perform appropriate adjustments listed in table 9.

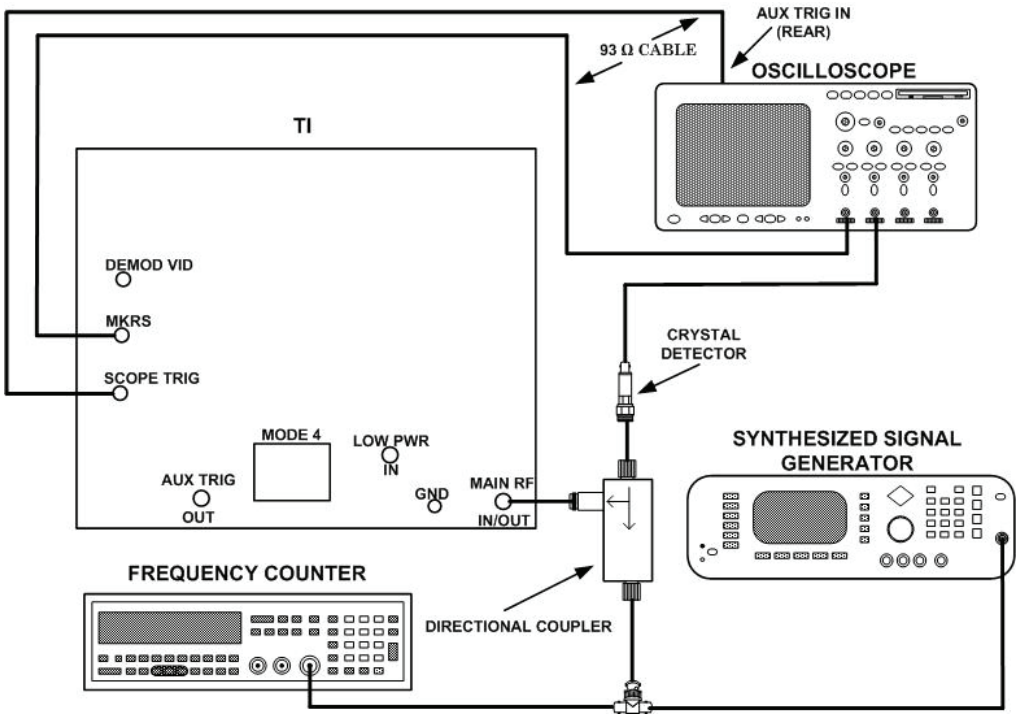

Figure 6. RF output frequency - equipment setup.

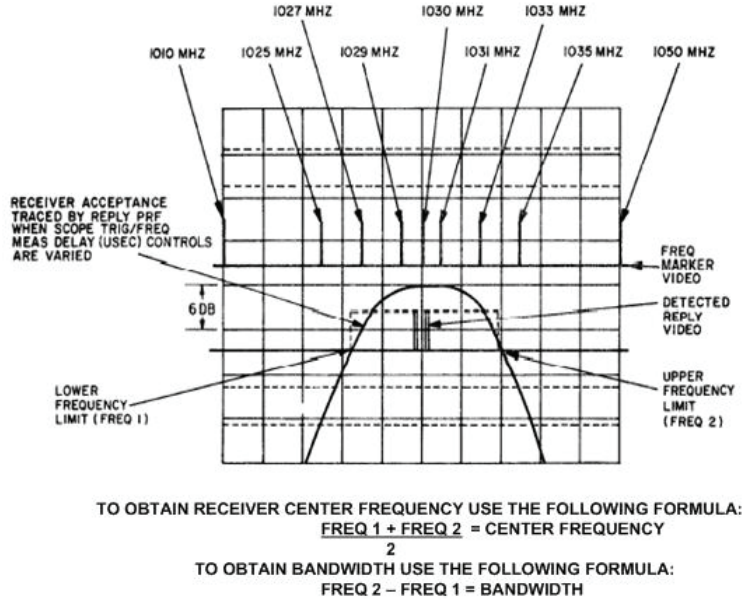

Figure 7. Receiver bandwidth - testing, oscilloscope display.

NOTE

If wrong number of markers are present after making above adjustments, perform **b** (2) through (9) below.

Table 9. RF Output Frequency Accuracy

Test instrument markers (MHz)	Frequency counter indications (MHz)		Adjustments (fig. 1) (R)
	Min	Max	
1027	1.0269	1.0271	A11A1R16 (MKR 3)
1029	1.0289	1.0291	A11A1R21 (MKR 4)
1030	1.0299	1.0301	A11A1R26 (MKR 5)
1031	1.0309	1.0311	A11A1R31 (MKR 6)
1033	1.0329	1.0331	A11A1R36 (MKR 7)
1035	1.0349	1.0351	A11A1R41 (MKR 8)
1050[1]	1.0497	1.0503	A11A1R46 (MKR 9)
1010	1.0097	1.0103	A11A1R6 (MKR 1)

[1]Set **SIG GEN FUNCTION** switch to **SWP ± 20 MHz**.

b. Adjustments

(1) Set synthesized signal generator frequency to l.0250 GHz as indicated by frequency counter. Adjust (A11MKR 2) (fig. 1) to align leading edge of 1025 marker with birdie on **CH2** of oscilloscope (R).

(2) Connect oscilloscope **CH2** input to TPF7 (fig. 1), using X10 probe.

(3) Set **SIG GEN FUNCTION** switch to **SWP ±5 MHz**. Adjust A11A1R80 (fig. 1) for a pulse width of 780 μs as indicated on CH2 of oscilloscope (R).

(4) Set **SIG GEN FUNCTION** switch to **SWP ±20 MHz.** Adjust A11A1R79 (fig. 1) for a pulse width of 2200 μs as indicated on **CH2** of oscilloscope (R).

(5) Disconnect probe from TPF7 and connect to TPF6 (fig. 1). Adjust A11A1R73 (fig. 1) to set the level of the ramp on **CH2** of the oscilloscope to 0.0 V dc (R).

(6) Set **SIG GEN FUNCTION** switch to **SWP ±5 MHz.** Adjust A11A1R74 (fig. 1) for a -1.2 to +1.2 V ramp amplitude (R).

(7) Set **SIG GEN FUNCTION** switch to **SWP ± 20 MHz**. Adjust A11A1R66 (fig. 1) for a -3.0 to +3.0 V ramp amplitude (R).

NOTE

While performing (2) through (7) above, observe the markers on **CH1** of oscilloscope. The markers should be inside the pulse in (3) and (4) above and should coincide with the ramp in (6) and (7) above.

(8) Repeat (2) through (7) above until the correct number of markers are present on **CH1** of oscilloscope.

(9) Repeat **a** (3) through (7) above.

18. Modulator and Demodulator Accuracy

a. Performance Check

(1) Connect equipment as shown in figure 2.

(2) Position controls as listed in paragraph **7 e** above.

(3) Observe that two pulses are present and adjust oscilloscope to position intensified trace over second pulse.

NOTE

If necessary, the 0.1 μs markers on **CH2** of oscilloscope may be used to make the measurements in (4) through (7) below.

(4) Adjust **MEASUREMENT DEMOD VID LEVEL** control for a pulse amplitude of 2.0 V as, indicated on oscilloscope **CH1** input. Measure pulse width. Pulse width will be between 0.75 and 0.85 μsec.

(5) Measure risetime at the 1 and 81 percent amplitude points. If risetime is not between 0.05 to 0.10 μs, perform **b** (1) below.

(6) Measure falltime using technique of (5) above. If falltime is not between 0.05 to 0.20 μs, perform **b** (2) below.

(7) Disconnect cable from **MAIN RF IN/OUT** jack and connect to **AUX RF IN/OUT** jack and repeat (3) through (6) above. Pulse rise and falltime will be between 0.05 and 0.20 μs, if not perform **b** (3) below.

b. Adjustments

(1) Adjust A16A1R40 (fig. 1) for 0.08 μs (R).

(2) Adjust A16A1R40 (fig. 1) for 0.12 μs (R).

(3) Adjust A16A1R39 (fig. 1) for 0.12 μs (R).

19. RF Power Output

a. Performance Check

(1) Connect power meter to **MAIN RF IN/OUT** connector.

(2) Position controls as listed in (a) through (d) below:

(a) **CHAL MODE SELECT** switch to **CW**.
(b) **SIG GEN FUNCTION** switch to **FIXED FREQ**.
(c) **MAIN ATTEN** control to **-10 dB**.
(d) **AUX ATTEN** control to **-10 dB**.

(3) Power meter will indicate -10.0 ±1.0 dBm, if not perform **b** below. Record power meter indication.

(4) Set **SIG GEN FUNCTION** switch to **SWP ±5 MHz**. Power meter will indicate within ±1.0 dBm of value recorded in (3) above.

(5) Set **SIG GEN FUNCTION** switch to **SWP ±20 MHz**. Power meter will indicate within ±1.0 dBm of value recorded in (3) above.

(6) Set **SIG GEN FUNCTION** switch to **FIXED FREQ** and **MAIN ATTEN** control to -20 dB. Power meter will indicate -20.0 ±1.0 dBm.

(7) Disconnect power meter from **MAIN RF IN/OUT** connector and connect to **AUX IN/OUT** connector.

(8) Repeat (3) through (6) above f or **AUX ATTEN** control.

b. Adjustments. Adjust A11A1R2 (fig. 1) for power meter indication of -10 dBm (R).

20. RF Input Power

a. Performance Check

(1) Connect equipment as shown in figure 8, CONNECTION A.

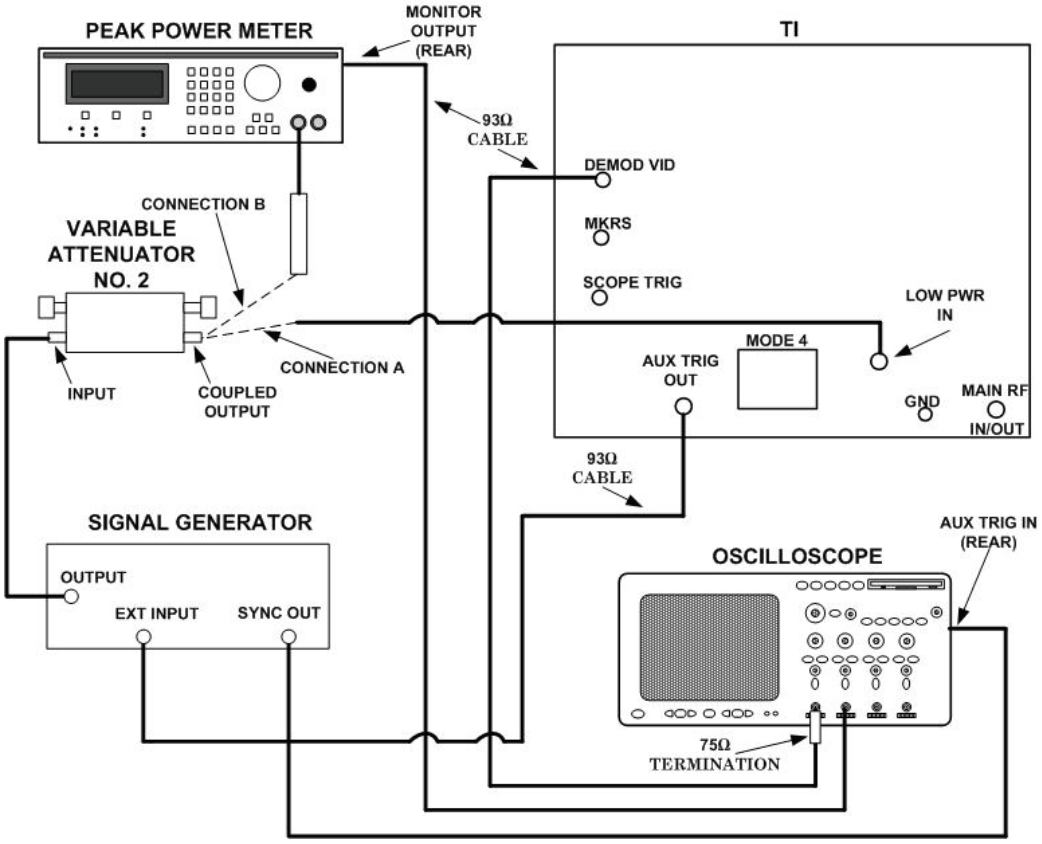

Figure 8. RF input low power - equipment setup.

(2) Set **MEASUREMENT FUNCTION SELECT** switch to **PWR** and **PRF SELECT RANGE** switch to **X100**.

(3) Adjust **MEASUREMENT DEMOD VID LEVEL** control for **MEASUREMENT** meter indication of 18 dBW.

(4) Set variable attenuator No. 2 dial to setting on calibration chart for 60 dB at 1090 MHz.

(5) Position signal generator controls for output frequency of 1090 MHz, **PULSE MODULATION WIDTH** control for **1** to **2 μs, PULSE MODULATION** switch to **EXT SYNC** and adjust **RF OUT** for a 1 V pulse indication of on oscilloscope **CH1**.

(6) Connect equipment as shown in figure 8, CONNECTION B.

(7) Set variable attenuator No. 2 dial to setting on calibration chart for 30 dB at 1090 MHz.

(8) Adjust peak power meter to set reference to top of pulse as viewed on **CH2** of oscilloscope. If peak power meter does not indicate between -3 and -1 dBm, perform **b** (1) through (10) below.

(9) Set variable attenuator No. 2 dial to setting on calibration chart for 45 dB at 1090 MHz.

(10) Adjust **MEASUREMENT DEMOD VID LEVEL** control for **MEASUREMENT METER** indication of **33 dBW**.

(11) Connect equipment as shown in figure 8, CONNECTION A.

(12) Set signal generator output an indication of 1 V pulse on **CH1** oscilloscope.

(13) Connect equipment as show figure 8, CONNECTION B.

(14) Set variable attenuator dial setting on calibration chart for 30 dB at 1090 Hz.

(15) Adjust peak power meter set reference to top of pulse as viewed on **CH2** of oscilloscope. If peak power meter does not indicate between -3 and -1 perform **b** (1) through (10) below.

(16) Connect equipment as show figure 9.

(17) Adjust **MEASUREMENT DEMOD VID LEVEL** control for **MEASUREMENT METER** indication of 18 **dBW**.

(18) Set variable attenuator No. 2 dial to setting on calibration chart for 28 dB at 1090 MHz.

(19) Repeat (5) above.

(20) Adjust peak power meter **(COARSE** and **FINE)** to set reference to top of pulse as viewed on oscilloscope **CH2**. If peak power meter does not indicate 0 dBm ±1 dBm, perform **b** (11) through (14) below.

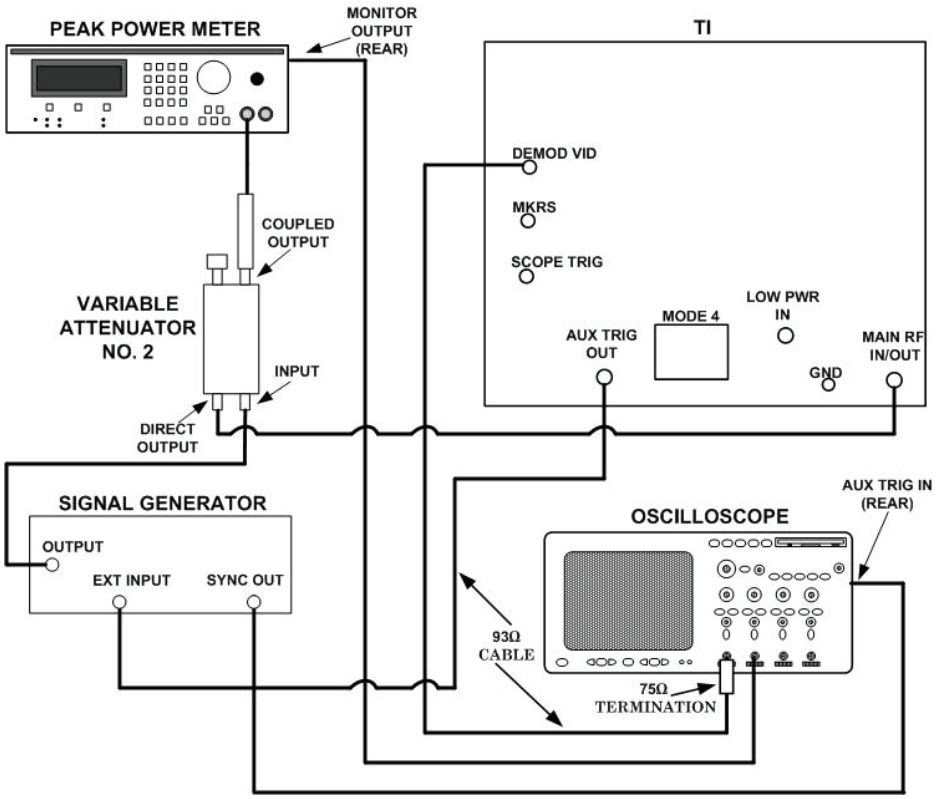

Figure 9. RF input high power - equipment setup.

(21) Adjust **MEASUREMENT DEMOD VID LEVEL** control for **MEASUREMENT, METER** indication of **33 dBW**.

(22) Set variable attenuator No. 2 dial to setting on calibration chart for 43 dB at 1090 MHz.

(23) Set signal generator output for an indication of 1 V pulse on oscilloscope CH 1.

(24) Adjust peak power meter to set reference to top of pulse as viewed on **CH2** of oscilloscope. If peak power meter does not indicate 0 ±1 dBm, perform **b** (11) through (14) below.

(25) Disconnect cable from **MAIN RF IN/OUT** and connect to **AUX RF IN/OUT**, set **DEMOD** switch to **DEMOD AUX** and repeat (16) through (24) above for **AUX RF IN/OUT**.

b. Adjustments

(1) Set variable attenuator No. 2 dial to setting on calibration chart for 30 dB at 1090 MHz.

(2) Adjust signal generator output for a -2 dBm reference on peak power meter as indicated on oscilloscope **CH2**.

(3) Adjust variable attenuator No. 2 dial to setting on calibration chart for 60 dB at 1090 MHz.

(4) Connect equipment as shown in figure 8, CONNECTION A.

(5) Adjust **MEASUREMENT DEMOD VID LEVEL** control for a 1-V pulse indication on **CH1** of oscilloscope (A5).

(6) Adjust M1A1R2 (fig. 1) for **MEASUREMENT METER** indication of **18 dBW** (R).

(7) Set variable attenuator No. 2 dial to setting on calibration chart for 45 dB at 1090 MHz.

(8) Adjust **MEASUREMENT DEMOD VID LEVEL** control for a 1-V pulse indication on **CH1** of oscilloscope.

(9) Adjust M1A1R7 (fig. 1) for **MEASUREMENT METER** indication of **33 dBW** (R).

(10) Repeat **b** (1) through (9) above until **MEASUREMENT METER** tracks from **18** to **33 dBW**.

NOTE

If **MEASUREMENT METER** does not track after repeating (1) through (9) above adjust M1A1R1 (fig. 1) slightly cw or ccw and repeat **b** (1) through (9) above.

(11) Set variable attenuator No. 2 dial to setting on calibration chart for 43 dB at 1090 MHz.

(12) Adjust signal generator output for a **0-dBm** reference on peak power meter.

(13) Adjust **MEASUREMENT DEMOD VID LEVEL** control for a **33 dBW** indication on **MEASUREMENT METER**.

(14) Adjust AR2C2 **(MAIN RF IN/OUT)** AR2C8 **(AUX RF IN/OUT)** for a 1-V pulse indication on **CH1** of oscilloscope (AR2C8 and AR2C2 are located on assembly 45413 151835) (R).

21. RF Input Frequency

a. Performance Check

(1) Connect equipment as shown in figure 10.

(2) Set **SIG GEN FUNCTION** switch to **SWP ±20 MHz** and **MEASUREMENT FUNCTION SELECT** switch to **FREQ**.

(3) Adjust synthesized signal generator output level and frequency until maximum amplitude point of pass band, displayed on **CH1** of oscilloscope, is aligned with first marker on oscilloscope **CH2** input. Synthesized signal generator will indicate between 1069.4 and 1070.6 MHz.

(4) Repeat (3) above for second through ninth marker. Synthesized signal generator will indicate as listed in table 10.

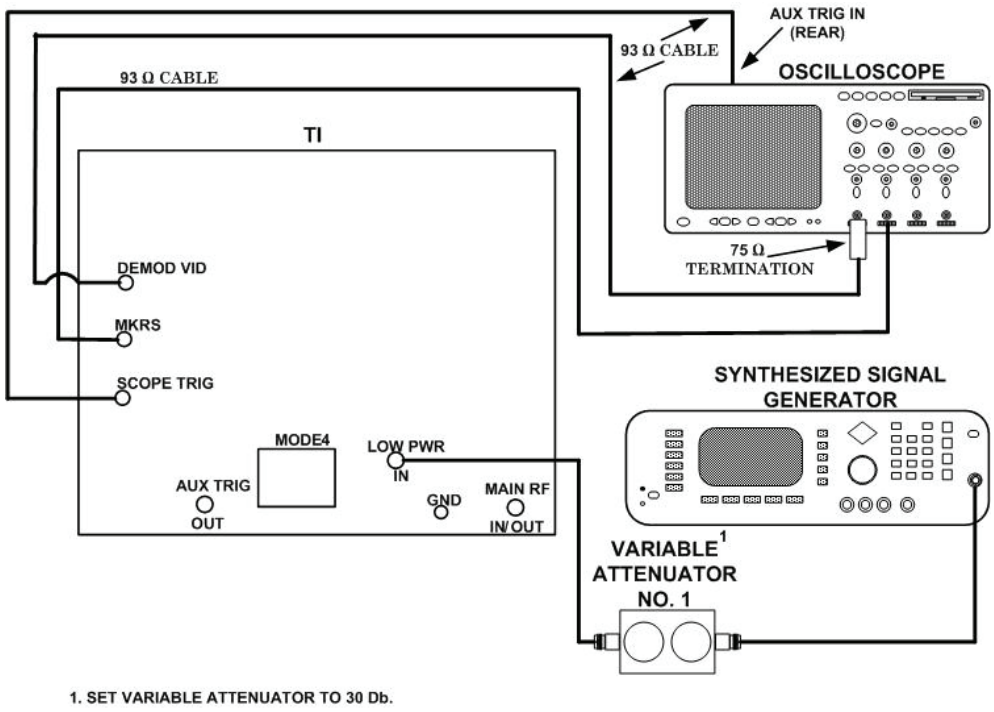

Figure 10. RF input frequency - equipment setup.

Table 10. RF Input Frequency Accuracy

Test instrument markers	Synthesized signal generator (MHz)	
	Min	Max
2d	1084.8	1085.2
3d	1086.8	1087.2
4th	1088.8	1089.2
5th	1089.8	1090.2
6th	1090.8	1091.2
7th	1092.8	1093.2
8th	1094.8	1095.2
9th	1109.4	1110.6

22. Power Supply

a. Performance Check

(1) Connect multimeter between PS1A1TP1 (fig. 1) and ground. If multimeter does not indicate between 27.75 and 28.25 V dc, perform **b** (1) below.

(2) Adjust autotransformer (A1) for 105 V ac. Multimeter will indicate between 27.75 and 28.25 V dc.

(3) Adjust autotransformer for 125 V ac. Multimeter will indicate between 27.75 and 28.25 V dc.

(4) Disconnect lead from PS1A1TP1 and connect to PS1A1TP5 (fig. 1). If multimeter does not indicate between 11.75 and 12.25 V dc, perform **b** (2) below.

(5) Disconnect lead from PS1A1TP5 and connect to PS1A1TP6 (fig. 1). If multimeter does not indicate between 11.75 and 12.25 V dc, perform **b** (3) below.

(6) Adjust autotransformer for 125 V ac. Multimeter will indicate between 11.75 and 12.25 V dc.

(7) Disconnect lead from PS1A1TP5 and connect to PS1A1TP7 (fig. 1). If multimeter does not indicate between 4.75 and 5.25 V dc, perform **b** (4) below.

(8) Adjust autotransformer for 105 V ac. Multimeter will indicate between 4.75 and 5.25 V dc.

b. Adjustments

(1) Adjust PS1A1R4 (fig. 1) for 28.0 V dc multimeter indication (R).

(2) Adjust PS1A1R26 (fig. 1) for 12.0 V dc multimeter indication (R).

(3) Adjust PS1A1R32 (fig. 1) for 12.0 V dc multimeter indication (R).

(4) Adjust PS1A1R36 (fig. 1) for 5.0 V dc multimeter indication (R).

23. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA label/form in accordance with TB 750-25.

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army

0802808

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342228, requirements for calibration procedure TB 9-6625-2089-24.

Instructions for Submitting an Electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@redstone.army.mil
To: <2028@redstone.army.mil

Subject: DA Form 2028

1. **From**: Joe Smith
2. Unit: home
3. **Address**: 4300 Park
4. **City**: Hometown
5. **St**: MO
6. **Zip**: 77777
7. **Date Sent**: 19-OCT –93
8. **Pub no:** 55-2840-229-23
9. **Pub Title**: TM
10. **Publication Date**: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. **Submitter FName**: Joe
14. Submitter MName: T
15. **Submitter LName**: Smith
16. **Submitter Phone**: 123-123-1234
17. **Problem**: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. **Text**

This is the text for the problem below line 27.

PIN NO: 084636-000