

TB 11-6625-657-35

Change 2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR INTERMEDIATE FREQUENCY TEST SET AN/GHM-63 (NSN 6625-00-089-4653)

Headquarters, Department of the Army, Washington, DC
30 June 1980

TB 11-6625-657-35, 29 August 1975, is changed as follows:

Page 3 Paragraph 2, Lines 7 and 8 are changed to read: "Commander, US Army Communications and Electronics Materiel Readiness Command,

ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703."

Page 4. Paragraph 7, Table 1, item No. A1, Calibration equipment column. Delete "Biddle-Gray Model 6011471 (7910328)" and add "CR10M (8598965) (NS 6625-00-678-9678)."

By Order of the Secretary of the Army.

Official-

J. C. PENNINGTON
*Major General, United States Army
The Adjutant General*

E. C. MEYER
*General, United States Army
Chief of Staff*

DISTRIBUTION:

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TB 11-6625-657-35

Change 1

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR INTERMEDIATE FREQUENCY TEST SET AN/GRM-63 (NSN 6625-00-089-4653)

Headquarters, Department of the Army, Washington, DC
15 April, 1976

TB 11-6625-657-35, 29 August 1975, is changed as follows:

Page 4, Table 1. Insert a fifth column for items A1 through A5 in sequence.

AN/GSM 256
equipment
G-R Model 1433Y
H-P Model 3406A
H-P Model 3490A
H-P Model 8640B
H-P Model 8640B

Add item A6.

Item NO	Common name	Minimum use Specifications	Calibration equipment*	AN/GSM 256 equipment
AS	Oscilloscope	Bandwidth 55 to 65 MHz	AN/USM-281	H-P Model 180B

Page 4 Paragraph 8d, line 1. "T1" is changed to "TI."

Page 6. Paragraph 9.1 is added after paragraph 9.1. AN/GSM-256 Test of First IF Amplifier/Second IF Simulator Response. a Performance Check

(1) Connect equipment as shown in figure 2, except connect TI J10 SCOPE OUTPUT to oscilloscope (A6).

NOTE

Signal generator (A5) must be terminated into 50 ohms.

(2) Adjust signal generator frequency to 60 MHz and output amplitude for sufficient indication on oscilloscope (A6).

(3) Adjust oscilloscope for a vertical amplitude of 8 centimeters.

(4) Increase signal generator frequency, keeping output amplitude constant, until vertical deflection on oscilloscope indicates 5.6 centimeters.

(5) Record signal generator frequency.

(6) Repeat (4) above, except decrease signal generator frequency and record the frequency.

(7) Subtract the value recorded in (6) above from the value recorded in (5) above. If the resultant bandwidth is not between 4.5 and 5.5 MHz, perform b below.

(8) Add the frequencies recorded in (5) and (6) above, then divide by 2. The center frequency will be between 59.5 and 60.5 MHz.

b Adjustment Adjust tuning L1 (fig. 8) on the second IF for a symmetrical flat-topped response centered at 60 MHz and a bandwidth between 4.5 and 5.5 MHz.

*TB 11-6625-657-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR INTERMEDIATE FREQUENCY TEST SET AN/GRM-63 (NSN 6625-00-089-4653)

Headquarters, Department of the Army, Washington, DC
29 August 1975

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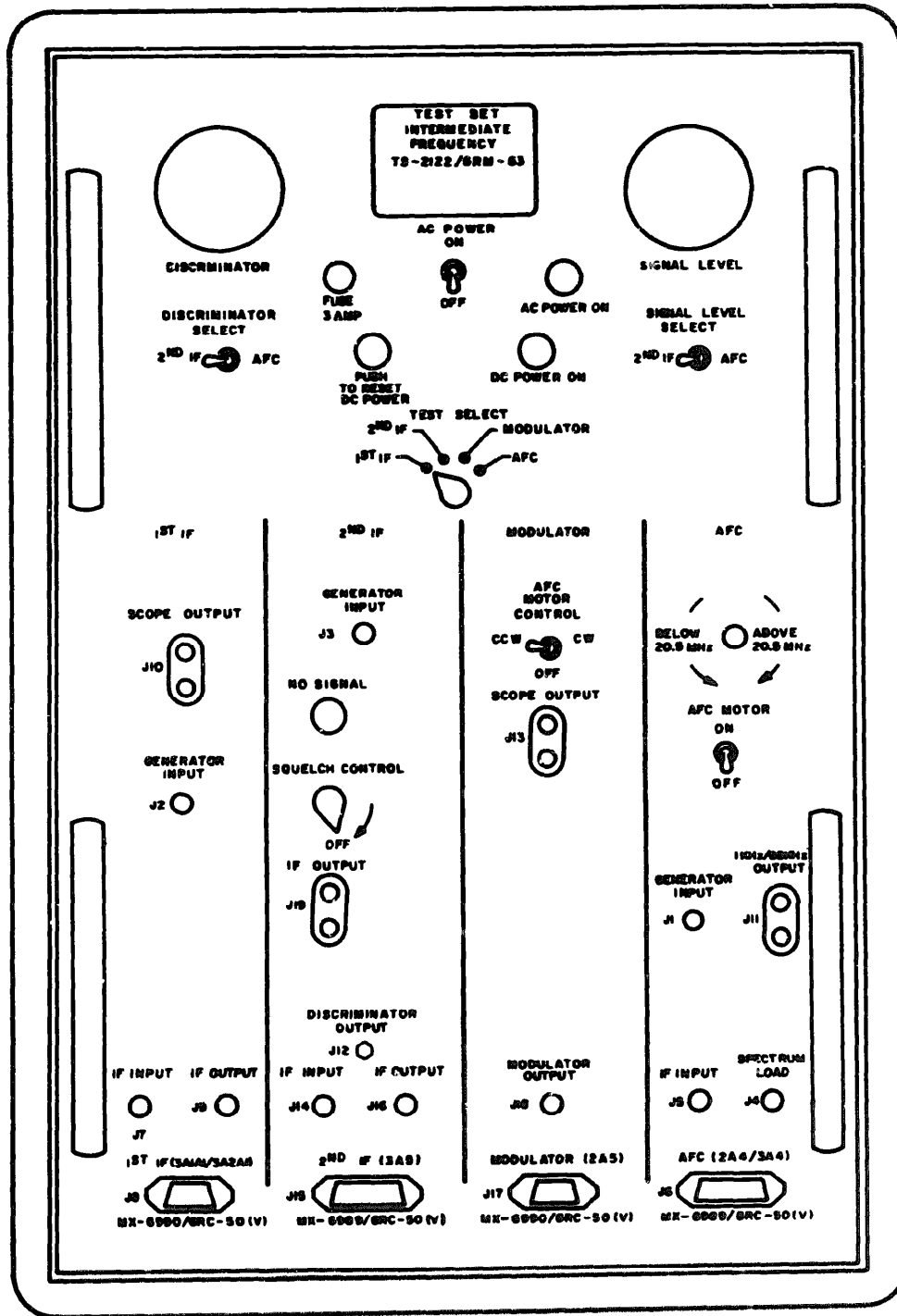
Section I. INTRODUCTION AND DESCRIPTION

1. Purpose and Scope. a. This bulletin provides **information** for the periodic calibration of Intermediate Frequency Test Set, AN/GRM-63 (fig. 1) which is used by calibration personnel. Since calibration personnel are trained and qualified in the use of calibration test and measuring equipment, detailed instructions concerning the operation and

use of the standards are not contained in this bulletin.

b. This bulletin contains illustrations that locate all controls and components used in the calibration procedure as well as diagrams showing equipment setups. Equipment ground connections are not necessarily shown in the diagrams.

*This bulletin supersedes TB 11-6625-657-35/1, 29 April 1968.



EL6625-657-35-YB-1

Figure 1. Test Instrument, front panel view

2. Report of Equipment Publication Improvements.

The reporting of errors, omissions, and recommendations for improving this bulletin by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-Q, Ft Monmouth, NJ 07703.

3. Description. Intermediate Frequency Test Set AN/GRM-63 is an instrument used to facilitate functional testing, alignment, and evaluation of Modulator Assembly 2A5 section of Transmitter, Radio T-893(P)/GRC, Afc Assembly 2A4/3A4 section of Transmitter, Radio T-893(P)/GRC and Receiver, Radio R-1148(P)/GRC, First IF. Assembly 3A1A1/3A2A1 section of Amplifier-Converter AM-1955(*) (3A1)/GRC and AM-1956(*) (3A2)/GRC, and the Second IF. Assembly 3A5 section of Receiver, Radio R-1148(P)/GRC and R-1331(P)/GRC. Additional data is listed in a, b, and c below.

a. Identification.

Nomenclature Intermediate Frequency Test Set, AN/GRM-63
National stock number 6825-00-089-4653
Size 27X17½X18½in.
Weight 60 lbs.
Reference TM 11-6625-657-12

b. Specifications.

Input requirements* 115 Vac±5%, 60 to 60 Hz, single phase, 100 watts

DC output voltages.

108 volts Adjustable to ±1 volt, 1.0% regulation
150 volts Adjustable to ±1 volt, 0.05% regulation
250 volts Adjustable to ±1 volt, 0.03% regulation
360 volts Fixed, unregulated, -20 to +50 volts

AC output voltages

6.3 volts.... Center-tapped, -5 to +15%
6.3 volts. -5 to +15%

First IF. Amplifier/Second IF. Simulator interface:

Input frequency Swept band, 55 to 65 MHz
Output response:
Bandwidth at 3db
points5 ± .5 MHz

Section II. EQUIPMENT REQUIREMENTS

NOTE

Minimum use specifications are the principal space parameters required for performance of the calibration, and are included to assist in the selection of alternate equipment, which may be used at the discretion of the calibrating activity. Satisfactory performance of alternate items shall be verified prior to use. All applicable equipment must bear evidence of current calibration.

Center frequency 60±5MHz

Modulator Assembly:

Input frequency Swept band, 45 to 55MHz
Bandwidth 25MHz minimum

Afc Simulator:

Input signal 20.5MHz, 300mV rms
Output signal 3mV rms minimum across 50-ohm load

c. Program Data.

Calibration interval In accordance with TB 43-180
Time required for calibration 3 hours (approx)
Technique Maintenance or Secondary Transfer calibration, Dc-low frequency

*These specifications are for information only and are not necessarily verified in this procedure.

4. General Instructions. a. Calibration Reporting

(1) Forms, records, and reports required for calibration personnel at all levels are prescribed by TM 38-750. DA Form 2416 (Calibration Data) must be annotated in accordance with TM 38-750 for each calibration performed.

(2) Adjustments to be reported on DA Form 2416 are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the(R) will follow the designated adjustment. Report only those adjustments made and designated with (R).

b. Test Instrument. Intermediate Frequency Test Set AN/GRM-63 will be referred to as TI (Test Instrument) throughout this bulletin.

c. Removal. Remove Test Set Cover (CW-952/GRM-G3. Release the rear door fasteners, and swing the rear door open (door can be lifted off its hinges).

d. Equipment Setup. Disconnect instructions are not contained in this bulletin.

e. Power Supply. When indications specified in paragraphs 8 through 14 are not within tolerance, perform the power supply check prior to making adjustments. After power supply adjustments are made, repeat paragraphs 8 through 14. Do not perform the power supply check if all other parameters are within tolerance.

5. Differences Among Models. None.

6. Equipment Required. Equipment required for calibration performance tests is listed in table 1 and is referenced within the text by common name and item identification number prefixed A.

7. Accessories Required. Accessories required for calibration performance tests are listed in table 2 and are referenced within the text by common name and item identification number prefixed B.

Table 1. Equipment Required

Item No.	Common Name	Minimum use specifications	Calibration equipment*
A1	Decade Resistor.....	Range: 6.0 megohms; 20 to 30 μ A Accuracy: \pm 1%	ZM-16/U or Fiddle-Gray, Model 6011471 (7910328)
A2	Electronic Voltmeter	Range: 3mV to 3V Accuracy: \pm 5%	AN/URM-145 or Ballantine, Model 310B (8616133-4)
A3	Electronic Voltmeter	Range: 3 to 7.245 Vac; 107 to 410 Vdc Accuracy: \pm 5%	ME-202/U or Dana, Model 5703 (7912606)
A4	Signal Generator	Range: 18 to 22 MHz Accuracy: \pm 5%	AN/USM-44A or H-P, Model 608CR (8598927-2)
A5	Signal Generator	Range: 5 to 100 MHz Accuracy: \pm 5%	TS-452D/U or H-P, Model 608CR (P598927-2)

*The calibration equipment utilized in this procedure was selected from those known to be available at Department of Defense Facilities, and the listing by make or model number carries no implication of preference, recommendation, or approval by the Department of Defense for use by other agencies. It is recognized that equivalent equipment produced by other manufacturers may be capable of equally satisfactory performance in the procedure.

Table 2. Accessories Required

Item No	Common Name	Description
B1	Module Extender	MX-6989/GRC-50(V) (P/O MK-715/GRC-50)
B2	Module Extender	MX-6990/GRC-50(V) (P/O MK-715/GRC50)
B3	Test Lead Set	CX-1331/U (P/O MK-715/GRC-50) (two required)
B4	Radio Frequency Cable Assembly	BNC plug to BNC plug, 8-1/2" (P/O MK-715/GRC50)
B5	Radio Frequency Cable Assembly	GG-409/U, BNC plug to BNC plug, 48 in.
B6	Radio Frequency Cable Assembly	CG-426/U, BNC plug to BNC plug
B7	Radio Frequency Cable Assembly	CG-3435/U, BNC plug to BNC plug, 7 in.
B8	Radio Frequency Cable Assembly	CG-3435/U, BNC plug to BNC plug, 1 ft 3-1/2 in
B9	Adapter	MX-4528/U (P/O AN/URM-145)
B10	Adapter Connector	BNC jack to double banana plug

Section III. CALIBRATION PROCESS

NOTE

It is recommended that personnel familiarize themselves with the entire procedure prior to performing calibration.

8. Preliminary Procedure.
 - a. Apply 115-volt ac \pm 5%, 50 to 60 Hz, single phase power to TI.
 - b. Set TI AC POWER switch to On.
 - c. Turn TI TEST SELECT switch to 1st IF.
 - d. Press T1 PUSH TO RESET DC POWER switch and allow 15 minutes for warmup and stabilization.

NOTE -

The following paragraphs are divided into subparagraph a, performance check, and b, adjustments. When the performance check

is within tolerance, do not perform the corresponding adjustment. When the performance check is not within tolerance, perform the corresponding adjustment before continuing with the calibration procedure. When the performance check IS not within tolerance and no adjustment is specified, the deficiency must be corrected before continuing with the procedure.

9. First IF. Amplifier/Second IF. Simulator Response.

- a. Performance Check.
 - (1) Connect equipment as shown in figure 2.

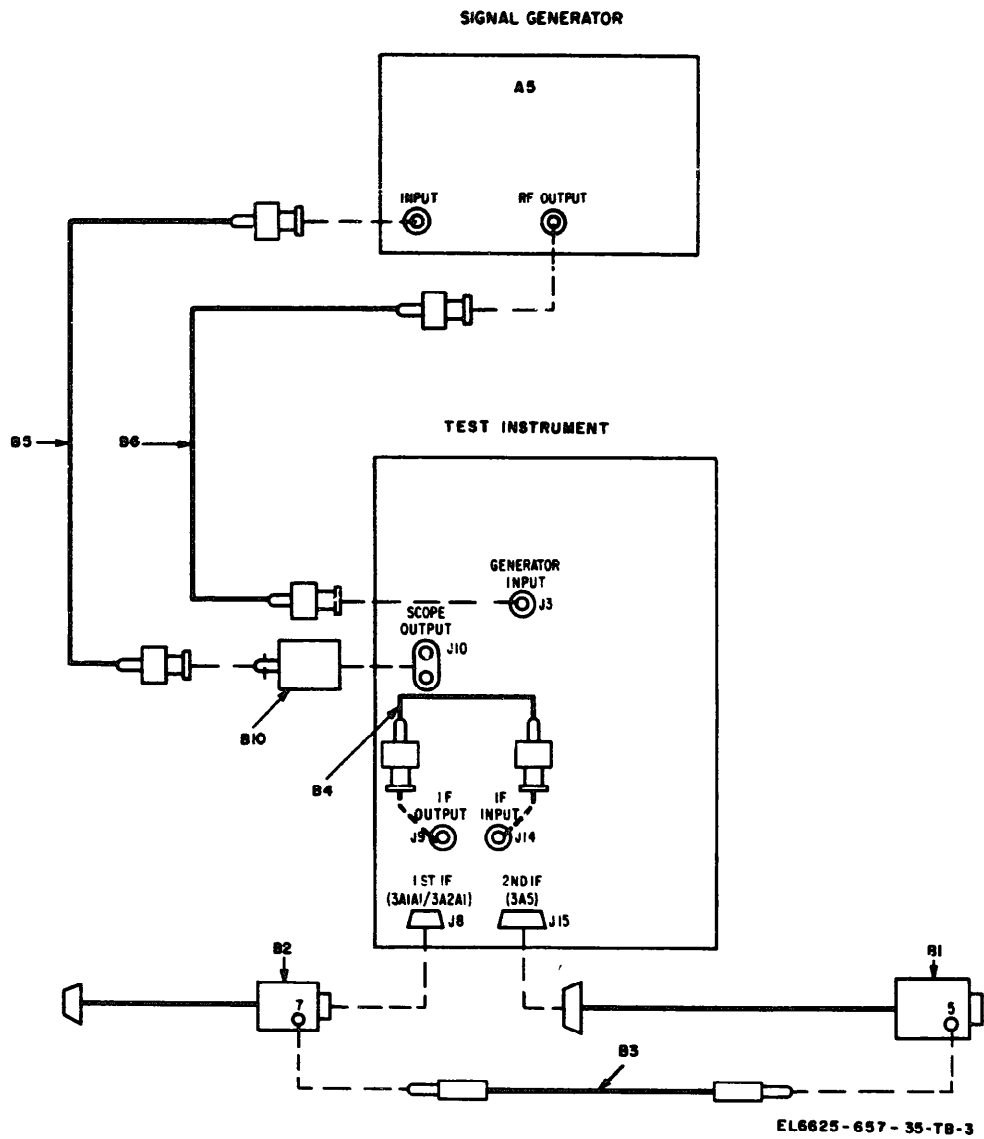


Figure 2. Test instrument, IF. simulator response test, equipment setup

(2) Adjust controls on signal generator (A5) for a sweep width of approximately 10MHz on band D with the wavemeter marker centered at 60 MHz on the display.

(3) Press signal generator attenuator 30 dB switch.

(4) Adjust the tuning control of the signal generator to locate the marker 3 dB below the peak at the lower frequency side and record the indicated frequency.

(5) Adjust the tuning control on the signal generator to locate the marker 3 dB below the peak at the high frequency side and record the indicated frequency.

(6) Subtract the frequency recorded in stop (4)

above from that recorded in step (5) to find the bandwidth. The bandwidth shall be $5\text{MHz} \pm 0.5\text{MHz}$.

(7) Add the frequencies recorded in steps (4) and (5) above and divide by 2 to find the center frequency. The center frequency shall be $60\text{MHz} \pm 0.5\text{MHz}$.

(8) The waveshape shall be flat within 1 dB between peaks.

b. Adjustments. Adjust tuning screw of L1 (fig. 8) on Second IF. Simulator Assembly A3 for a symmetrical flat-topped response centered at 60 MHz and a bandwidth of $5\text{MHz} \pm 0.5\text{MHz}$.

10. Modulator Detector Alignment. a. Performance Check

(1) Connect equipment as shown in figure 3.

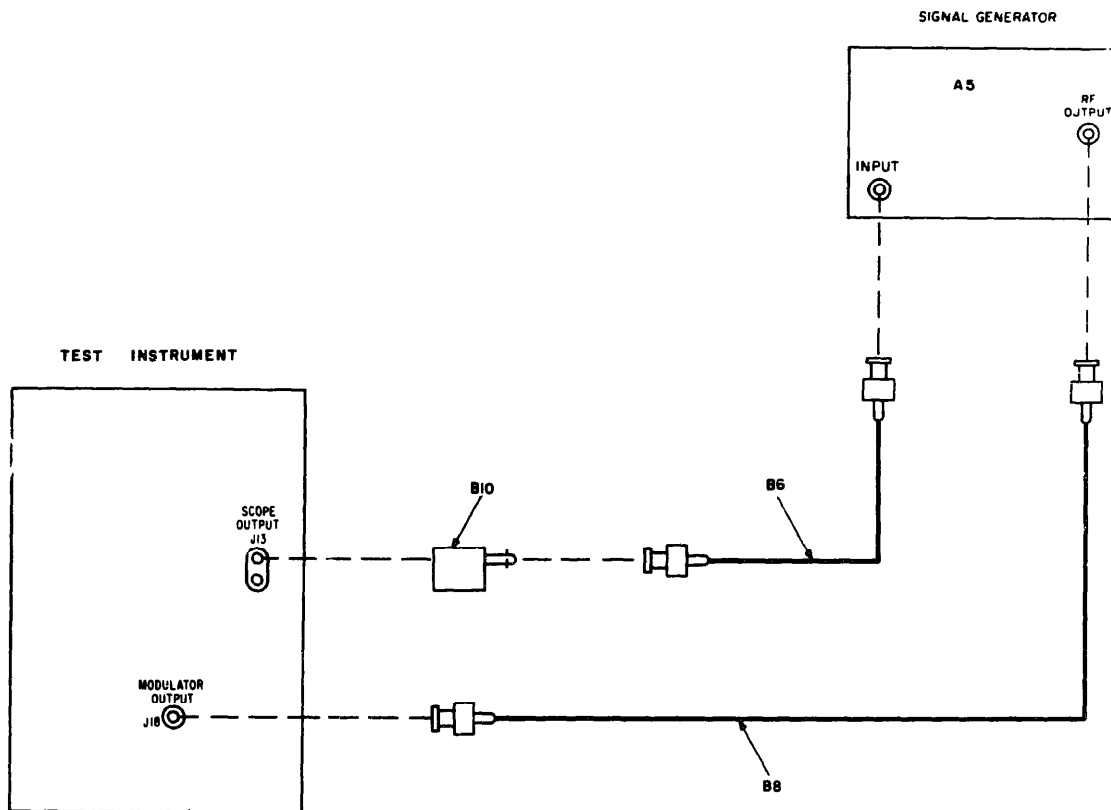


Figure 3. Test instrument, modulator detector response test, equipment setup EL6625-657-35-TB-4

(2) Adjust the signal generator for maximum vertical deflection, 0 attenuation and sweep of 30 to 150 MHz.

(3) Adjust the tuning control to locate the marker 2 dB below the low frequency peak at the lower frequency side.

(4) Adjust the tuning control to locate the

marker 2 dB below the low frequency peak at the high frequency side.

(5) The bandwidth between the low and high frequency shall be a minimum of 25 MHz.

(6) The high frequency peak shall be 0 to -2dB with respect to the low frequency peak.

b. Adjustments. Adjust tuning screw L1 (fig 8) on

modulator detector assembly A6 for a symmetrical flat-topped response as described in a(3) through (6) above.

11. Afc Simulator Test. *a. Performance Check.*
 (1) Connect equipment as shown in figure 4.

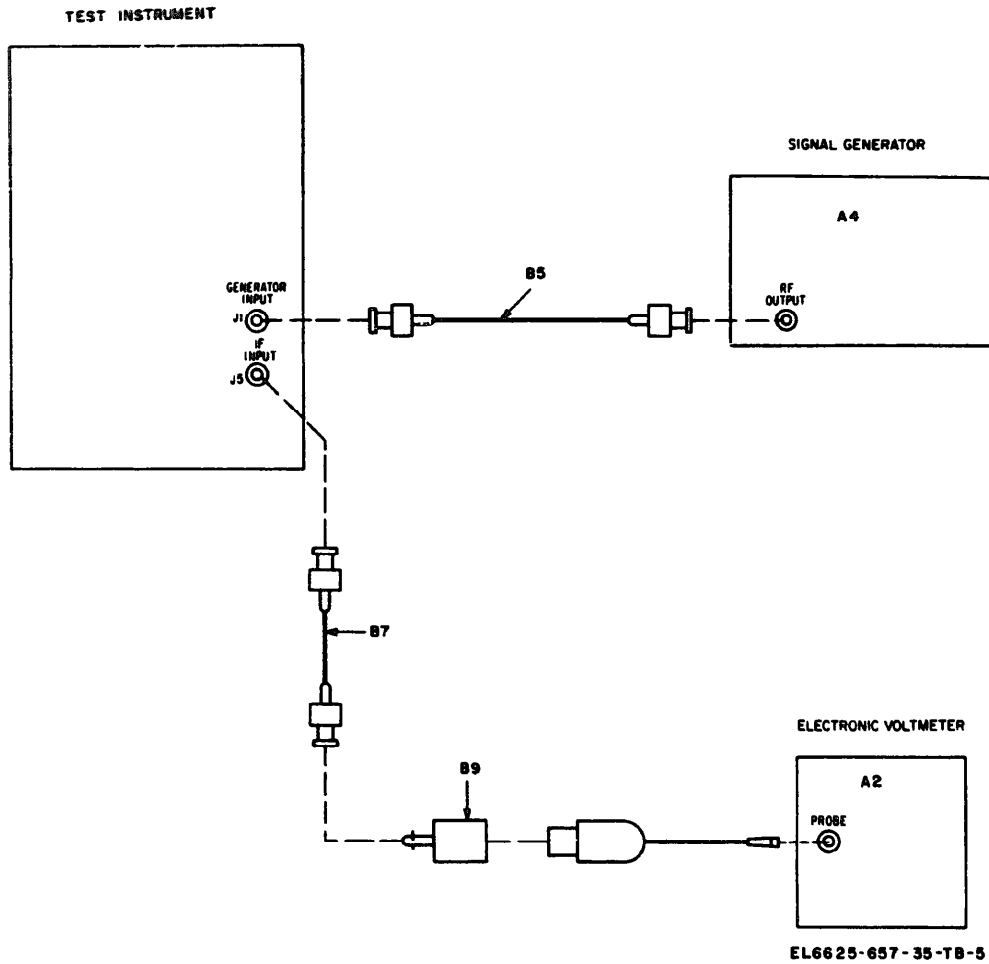
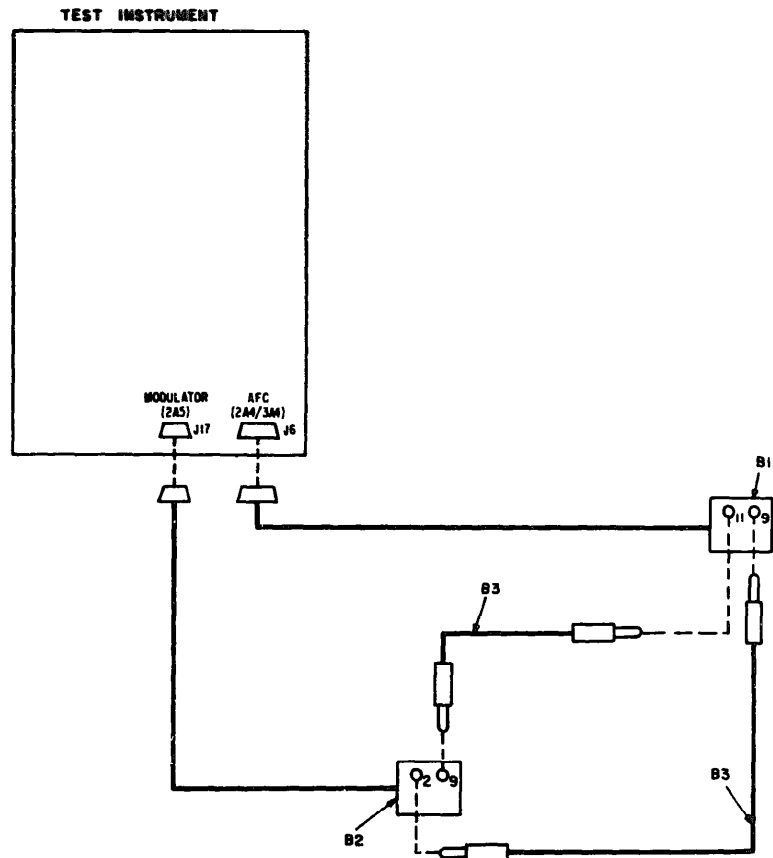


Figure 4. Test instrument, AFC simulator response test, equipment setup.

- (2) Set TI AC POWER switch to OFF.
 (3) Adjust signal generator (A4) frequency to 20.5 MHz with a cW output of 300 mV.
 (4) Electronic voltmeter (A2) should indicate 3

- mV or greater.
b. Adjustments. No adjustments can be made.
 12. Afc Error Indicator: *a. Performance Check.*
 (1) Connect equipment as shown in Figure 5.



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Figure 5. Test instrument, afc error indicator test, equipment setup

(2) Set TI AC POWER and AFC MOTOR switches to ON.

(3) Set TI AFC MOTOR CONTROL switch to CW. TI ABOVE 20.5 MHz and BELOW 20.5 MHz (afc error indicator) should indicate CW (clockwise) rotation.

(4) Set TI AFC MOTOR CONTROL switch to CCW. ABOVE 20.5 MHz and BELOW 20.5 MHz

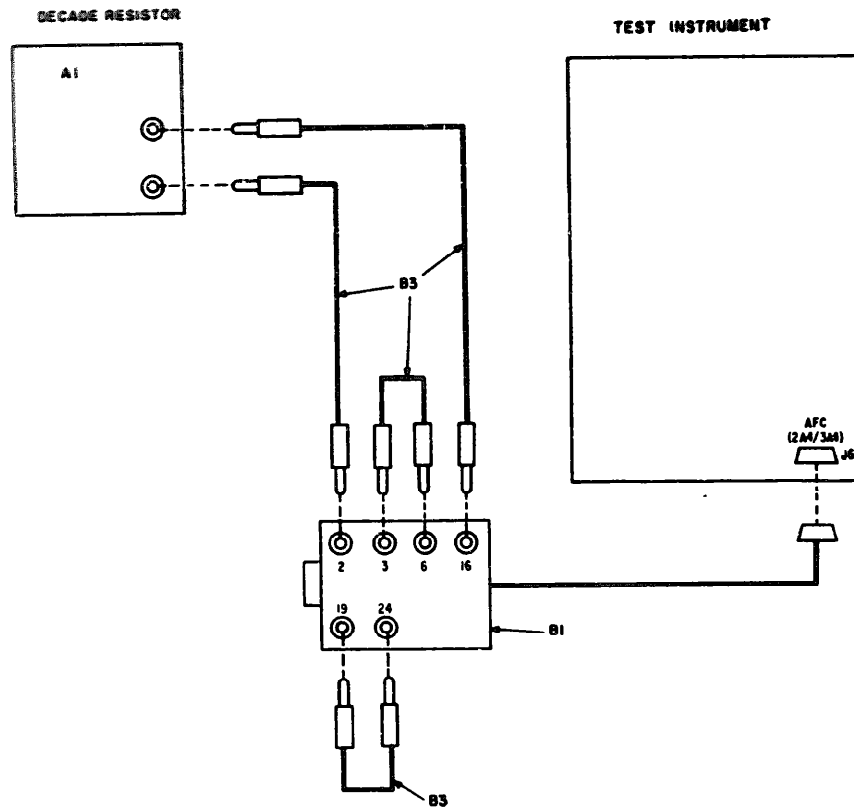
indicator should indicate CCW (counterclockwise) rotation.

(5) Set TI AFC MOTOR switch to OFF.

b. Adjustments. No adjustments can be made.

13. Signal Level Meter Calibration. a. Performance Check.

(1) Connect equipment as shown in figure 6.



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Figure 6. Test instrument, signal level meter calibration, equipment setup.

- (2) Adjust decade resistor (A1) for 6.0 megohms.
- (3) Check that meter is at mechanical zero and adjust, if necessary.
- (4) Position TI controls as indicated in (a),(b), and (c) below.
 - (a) TEST SELECT switch to AFC.
 - (b) Press PUSH TO RESET DC POWER switch.
 - (c) Set SIGNAL LEVEL SELECT switch to

AFC.

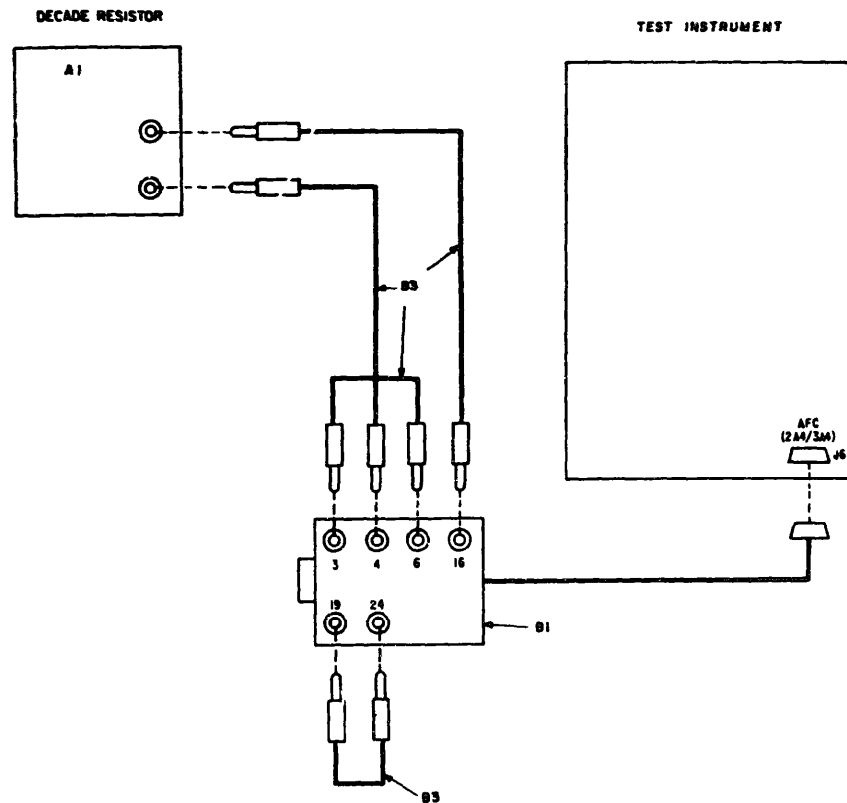
(5) SIGNAL LEVEL meter shall indicate between 22 and 28 mA.

(6) Turn TEST SELECT switch to MODULATOR

b. Adjustments. No adjustment can be made.

14. Discriminator Meter Calibration. a. Performance Check.

- (1) Connect equipment as shown in figure 7.



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Figure 7. Test instrument, discriminator meter calibration, equipment setup.

- (2) Adjust decade resistor (A1) for 6.0 megohms.
 - (3) Check that meter is at mechanical zero.
 - (4) Position TI controls as indicated in (a), (b), and (c) below.
 - (a) TEST SELECT switch to AFC
 - (b) Press PUSH TO RESET DC POWER switch.
 - (c) DISCRIMINATOR SELECT switch to **AFC.**
 - (5) DISCRIMINATOR meter shall indicate between 20 to 30 ua in a positive direction (right of center)
 - (6) Reverse the leads connected to item 1 at test jacks 6 and 16.
 - (7) DISCRIMINATOR meter shall indicate **between 20 to 30 mA in a negative direction.**
 - b. Adjustments. No adjustments can be made.**
15. Power Supply Ac Output Voltage Measurements. *a. Performance Check.*
- (1) Adjust electronic voltmeter (A3) to indicate **6.3 Vac** with null switch set to .1.
 - (2) Connect the electronic voltmeter using test leads (B3) between A7TB1-6 and 7 (fig. 2). Electronic voltmeter shall indicate between 5.985 and 7.245 Vac.
 - b. Adjustments. No adjustments can be made.**
16. Power Supply Dc Output Voltage Measurements. *a. Performance Check.*
- (1) Adjust electronic voltmeter (A3) to indicate + 108 Vdc with null switch set to 1.
 - (2) Connect the electronic voltmeter using test leads (B3) to A7TB1-15 and 17. Electronic voltmeter shall indicate between + 107 and + 109 Vdc.
 - (3) Adjust electronic voltmeter to indicate + 150 Vdc.
 - (4) Move the test lead from terminal 17 to 18. Electronic voltmeter shall indicate between +149 and +151 Vdc**
 - (5) Adjust electronic voltmeter to indicate +250 Vdc.**
 - (6) Move the test lead from terminal 18 to 19. Electronic voltmeter shall indicate between +249 and +251 Vdc.**

(7) Adjust electronic voltmeter to indicate +370 Vdc with null switch set to 10.

(8) Move the test lead from terminal 19 to 20. Electronic voltmeter shall indicate between +340

and +410 Vdc.

b. Adjustments.

(1) Adjust 108 VOLT control (fig. 2) for an indication of + 108 Vdc on electronic voltmeter.

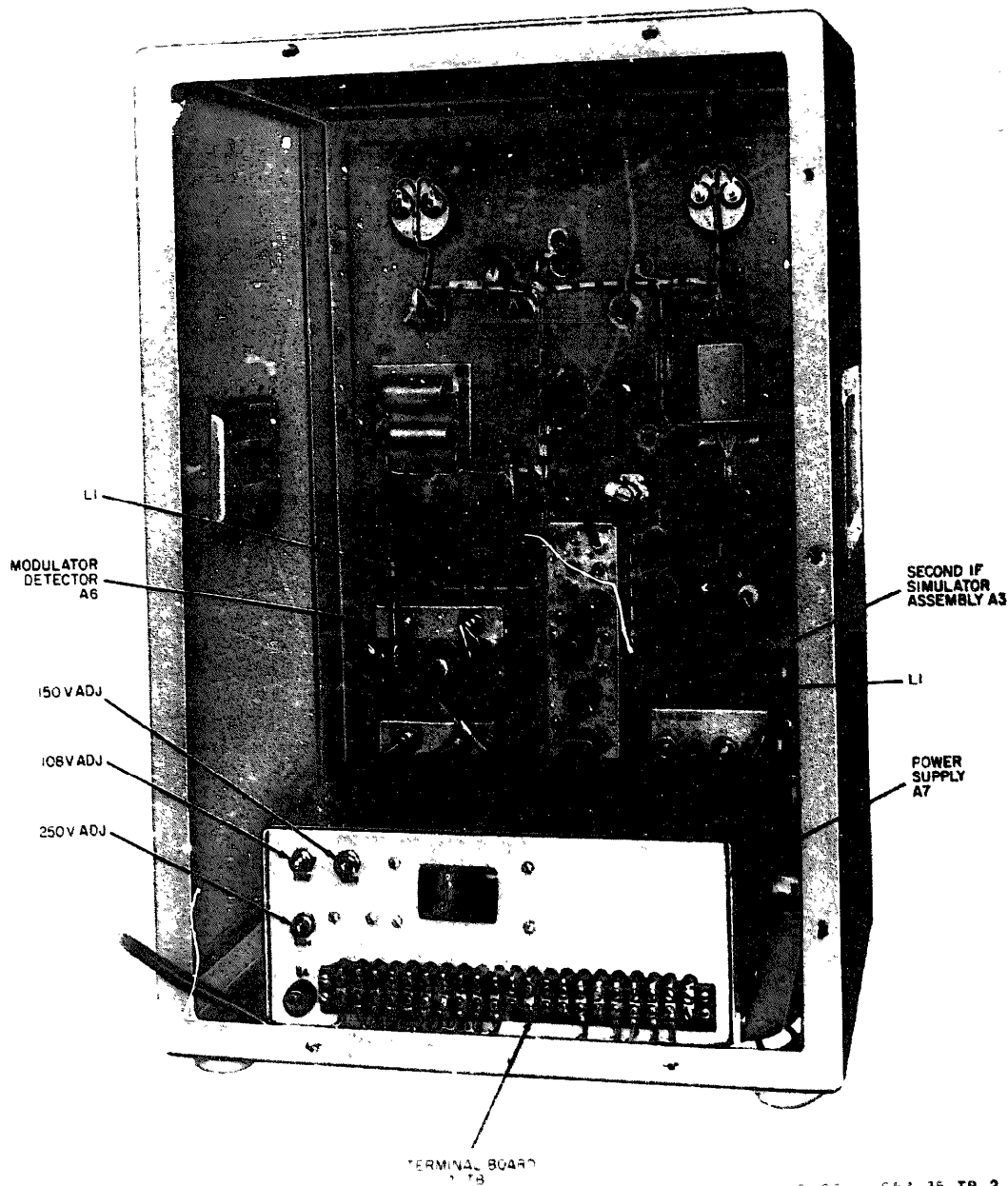


Figure 8. Test instrument rear view

(2) Adjust TI 150 VOLT control (fig 2) for an indication of + 150 Vdc on electronic voltmeter

(3) The +360 Vdc supply has no adjustments.

17. Final Procedure. a. Deenergize and disconnect all test equipment.

b. Deenergize TI and moun. ac power cord inside rear door.

c. Mount all TI authorized accessories inside rear door

d. Close and fasten rear door

e. Replace Test Set Cover CW-952/GRM-63.
f. In accordance with TM 38-750, annotate and affix calibration DA Label 80 (U.S. Army Calibration

System), When the TI cannot be adjusted to within tolerance, annotate and affix red tag, DA Form 2417 (Unserviceable or Limited Use).

By Order of the Secretary of the Army:

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

FRED C. WEYAND
General, United States Army
Chief of Staff

Distribution:

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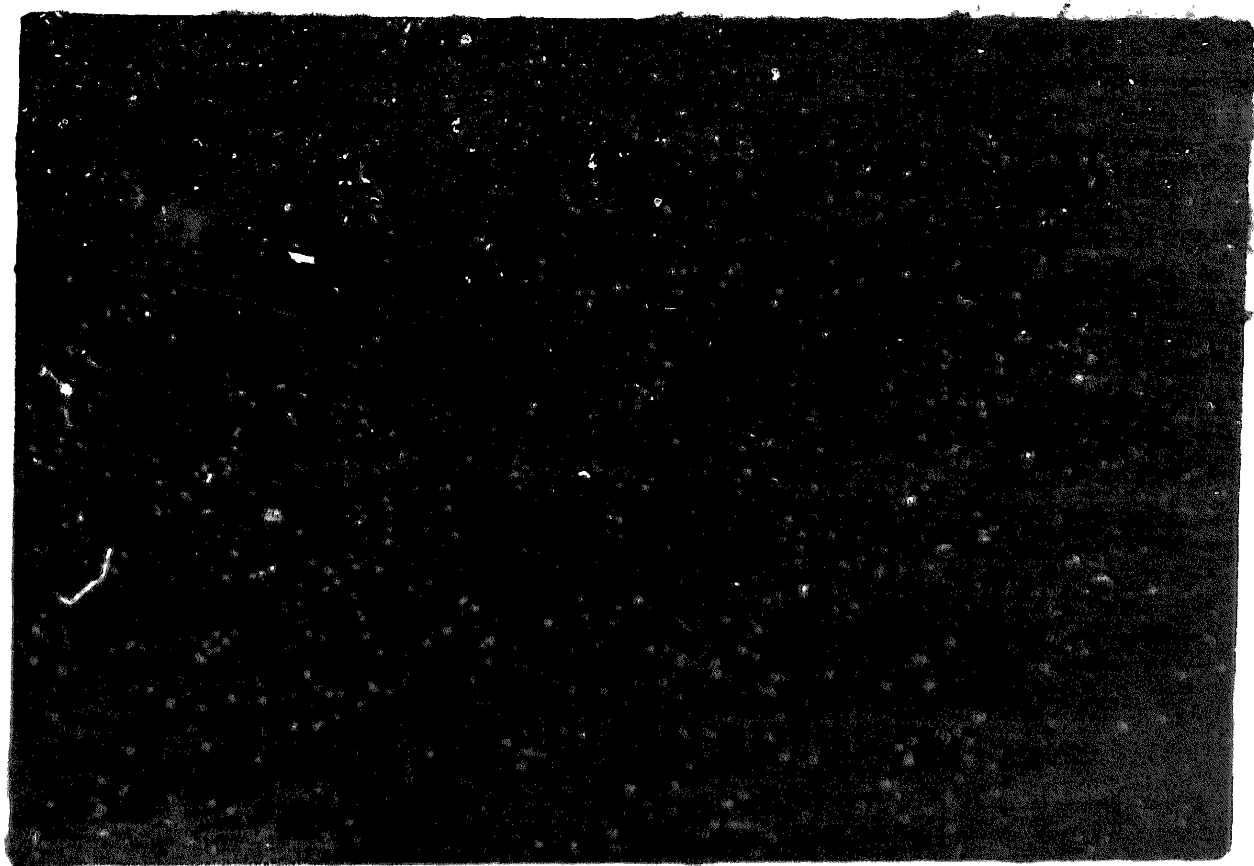
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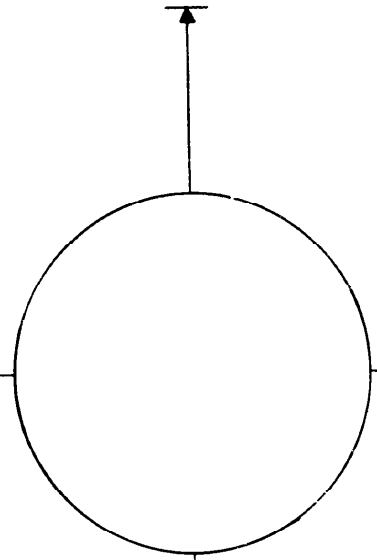
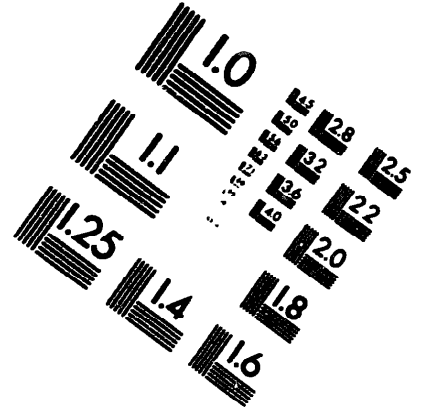
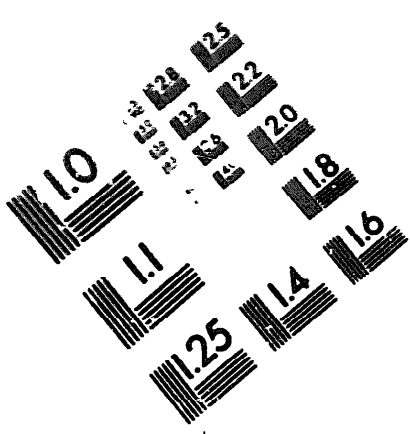
DATE





DEPARTMENT OF THE ARMY

MICROFORM
TEST TARGET



150 MM

1.0 mm (e= 81 mm)

ABCDEFGHIJKL MNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstu vwxyz\$%&/'%# 1/2 1/4 —=+ x&@*

1.5 mm (e= 1 09 mm)

ABCDEFGHIJKL MNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstu vwxyz\$%&/'%# 1/2 1/4 —=+ x&@*

2.0 mm (e= 1 37 mm)

ABCDEFGHIJKL MNOPQRSTUVWXYZ
abcdefghijklmnopqrstu vwxyz
1234567890\$%&/'%# 1/2 1/4 —=+ x&@*

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKL MNOPQRST UVWXYZ
abcdefghijklmnopqrstu vwxyz
1234567890\$%&/'%# 1/2 1/4 —=+ x&@*

1.0 mm (e= 81 mm)

ABCDEFGHIJKL MNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstu vwxyz\$%&/'%# 1/2 1/4 —=+ x&@*

1.5 mm (e= 1 09 mm)

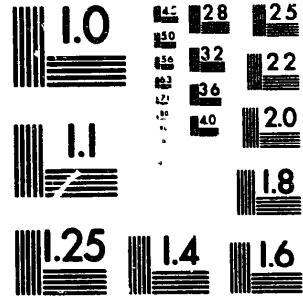
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abcdefghijklmnopqrstu vwxyz\$%&/'%# 1/2 1/4 —=+ x&@*

2.0 mm (e= 1 37 mm)

ABCDEFGHIJKL MNOPQRSTUVWXYZ
abcdefghijklmnopqrstu vwxyz
1234567890\$%&/'%# 1/2 1/4 —=+ x&@*

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKL MNOPQRST UVWXYZ
abcdefghijklmnopqrstu vwxyz
1234567890\$%&/'%# 1/2 1/4 —=+ x&@*



200 MM

250 MM

