INTEGRATED CIRCUIT IMMUNITY

DOD E³ Program Review
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EMI IMMUNITY TESTING
THRESHOLD DEFINITION

- Vout
  - High: 2.0 V
  - Unk: 0.8 V
  - Low

- EMI
- SIG

- Vt1 Immunity Lvl
- Vt2 Immunity Lvl
THRESHOLD DEFINITION

![Diagram showing threshold definition with voltage levels and EMI SIG markers.](image-url)
BIAS TEE FUNCTION

EMI Sig In → DC & Msnt → EMI Sig

DC & Msnt →
BIAS TEE CALIBRATION SET-UP

HP 8757C Scalar
Network Analyzer

HP 8350B
Sweep Osc

HP 83592A
RF Plug-in
OUT

HP 11664E
Detector

HP 11664E
Detector

Pwr
Splitter
HP 11667A

Bias Tee
ZBFT-6G

HP 85027B
Dir Bridge

50 ohm
Load
ZBFT-6G, S/N 1-20

GHz

dB Gain

Series 1
Series 2
Series 3
Series 4
Series 5
Series 6
Series 7
Series 8
Series 9
Series 10
Series 11
Series 12
Series 13
Series 14
Series 15
Series 16
Series 17
Series 18
Series 19
Series 20
EDM TEST FIXTURE
EMI IMMUNITY LEVELS

Chart 2. EMI IMMUNITY LEVEL
74ALS00 NAND GATES

![Graph showing EMI immunity levels for 74ALS00 NAND gates. The graph plots immune level (in dBm) against frequency (in MHz). There are three curves: one for Vo=Vt1, another for Vo=Vt2, and a line marked '70's Data'.]
NAND vs. AND GATE IMMUNITY

**Chart 1. EMI IMMUNITY LEVEL**
7400 NAND GATES

**Chart 2. EMI IMMUNITY LEVEL**
74ALS00 NAND GATES

**Chart 3. EMI IMMUNITY**
74LS00 NAND GATES

**Chart 4. EMI IMMUNITY LEVEL**
7408 AND GATES
TTL vs. LS IMMUNITY LEVELS

Chart 5. EMI IMMUNITY LEVEL
7402 POS NOR GATES

Chart 6. EMI IMMUNITY LEVEL
74LS02 POS NOR GATES

Chart 7. EMI IMMUNITY LEVEL
7404 TOTEM POLE INVERTER

Chart 8. EMI IMMUNITY LEVEL
74LS04 TOTEM POLE INVERTER

DOD E3 Program Review
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J. Sketoe, Boeing Co.
A. Clark, NASA, MFSC

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TP vs. OC IMMUNITY LEVELS

Chart 7. EMI IMMUNITY LEVEL
7404 TOTEM POLE INVERTER

Chart 8. EMI IMMUNITY LEVEL
74LS04 TOTEM POLE INVERTER

Chart 9. EMI IMMUNITY LEVEL
7405 OPEN COLLECTOR INVERTER

Chart 10. EMI IMMUNITY
74LS05 OPEN COLLECTOR INVERTER
Chart 11: EMI IMMUNITY LEVEL
7805 VOLTAGE REGULATOR

Frequency [MHz]

Immune Level [dBm]

- Vo=Vt1
- Vo=Vt2
- 70's Data
# SEVENTIES CHIP SET

<table>
<thead>
<tr>
<th>TTL:</th>
<th>7400, 7402, 7404, 7405, 7408, 7432, 7450, 7473, &amp; 7479</th>
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<td>CMOS:</td>
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<td>Line drvr/rcvr:</td>
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<td>Voltage Reg:</td>
<td>(3-pin) 309, 320, 78M05, (8-pin) 300, &amp; 305</td>
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<tr>
<td>Comparators:</td>
<td>306, 311, 339, 360, 710, &amp; 760</td>
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<tr>
<td>TOTAL NUMBER TYPES</td>
<td></td>
<td>38</td>
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