

MMIC Test Boards: Instructions for Use

(AN-60-036)

1.0 Introduction

Mini Circuits manufacture a wide range of 4-pin MMIC surface-mount and drop-in amplifiers. Family of test boards, for evaluating these devices, has been designed as to make them easy to use by customer.

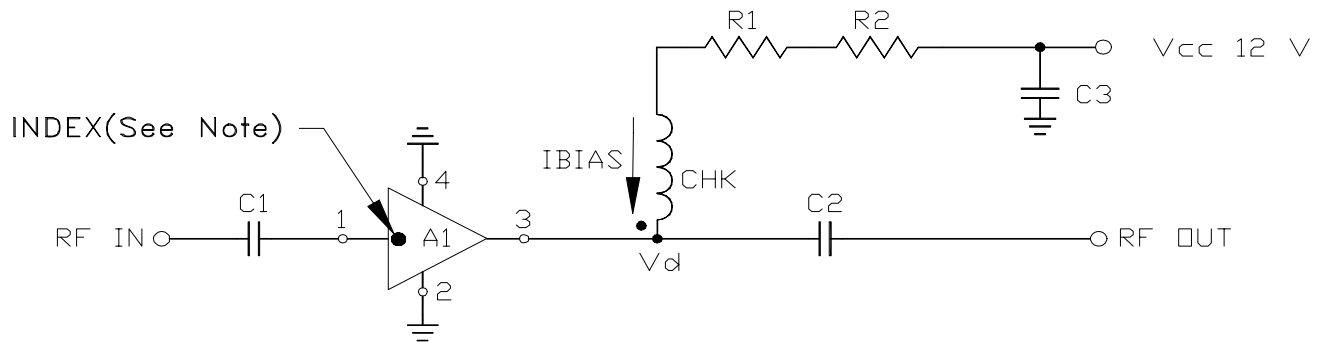
On the board, all components external to the amplifier, such as bias resistors, DC blocking and bypass capacitors, RF choke, together with the amplifier have been placed and soldered onto the Test Board. In this board, measured performance of the device under test is affected by these external components. Tables in §3 shows the loss of test board. Add the values given in §3 for respective models to the measured gain to get actual amplifier gain.

2.0 General Schematics:

MMIC amplifiers have different device voltages and operating currents. This test board has been configured to use a fixed supply voltage, 12V, irrespective of the amplifier. DC current flowing through the amplifier is set by suitable selection of bias resistors.

Table 1 Test Board components:

Component	Value	Function
C1,C2	2400 nF	DC blocking
L1	MCL Model TCCH-80A+	RF choke
R1	Depends on Model	Sets bias current
R2	Depends on Model	Sets bias current
C3	0.1 μ F	Bypass capacitor; Bypass noise of supply voltage
A1	Depends on Model	See Table



Note: Location of index depends on model

2.1 Procedure for using Test Board

Follow these steps to use the Test Board.

1. Calibrate the Network Analyzer.
2. First, connect the RF output port of the Test Board to the Network Analyzer.
3. Then, apply +12 V DC.
4. Finally, connect the RF input port of the Test Board to the Network Analyzer and apply RF input. Gain is now displayed on the Network Analyzer.

3.0 Test Board Loss

Frequency (GHz)	Insertion Loss (dB)
1	0.64
2	1.03
3	1.63
4	1.32
5	1.46
6	1.90
8	3.21

Table 2.1: Insertion Loss of Test Board for ERA, MAR, RAM, and GALI Amplifiers

Frequency (GHz)	Insertion Loss (dB)
1	0.68
2	1.15
3	1.63
4	1.46
5	1.72
6	2.18
8	2.78

Table 2.2: Insertion Loss of Test Board for LEE Amplifiers

Frequency (GHz)	Insertion Loss (dB)
0.1	0.43
0.5	0.5
1	0.59
2	0.79
4	0.92
6	1.78

Table 2.3: Insertion Loss of Test Board for MAV Amplifiers

4.0 Amplifier and Test Board Cross Reference

Amplifier	Test Board
ERA-1SM(+)	TB-408-1+
ERA-2SM(+)	TB-408-2+
ERA-21SM(+)	TB-408-21+
ERA-3SM(+)	TB-408-3+
ERA-33SM(+)	TB-408-33+
ERA-4SM(+)	TB-408-4+
ERA-5SM(+)	TB-408-5+
ERA-50SM(+)	TB-408-50+
ERA-51SM(+)	TB-408-51+
ERA-6SM(+)	TB-408-6+
ERA-8SM(+)	TB-408-8+
GALI-1+	TB-409-1+
GALI-19+	TB-409-19+
GALI-2+	TB-409-2+
GALI-21+	TB-409-21+
GALI-24+	TB-409-24+
GALI-29+	TB-409-29+
GALI-3+	TB-409-3+
GALI-33+	TB-409-33+
GALI-39+	TB-409-39+
GALI-4+	TB-409-4+
GALI-4F+	TB-409-4F+
GALI-49+	TB-409-49+
GALI-5+	TB-409-5+
GALI-5F+	TB-409-5F+
GALI-51+	TB-409-51+
GALI-51F+	TB-409-51F+
GALI-52+	TB-409-52+
GALI-55+	TB-409-55+
GALI-59+	TB-409-59+
GALI-6+	TB-409-6+
GALI-6F+	TB-409-6F+
GALI-74+	TB-409-74+
GALI-84+	TB-409-84+
MAR-1SM(+)	TB-411-1+
MAR-2SM(+)	TB-411-2+
MAR-3SM(+)	TB-411-3+
MAR-4SM(+)	TB-411-4+
MAR-6SM(+)	TB-411-6+
MAR-7SM(+)	TB-411-7+
MAR-8SM(+)	TB-411-8+
MAR-8ASM(+)	TB-411-8A+

Amplifier	Test Board
MAV-11SM(+)	TB-412-11+
MAV-11A(+)	TB-412-11A+
MAV-BSM(+)	TB-412-11B+
LEE-19+	TB-413-19+
LEE-29+	TB-413-29+
LEE-39+	TB-413-39+
LEE-49+	TB-413-49+
LEE-59+	TB-413-59+
RAM-1(+)	TB-414-1+
RAM-2(+)	TB-414-2+
RAM-3(+)	TB-414-3+
RAM-4(+)	TB-414-4+
RAM-6(+)	TB-414-6+
RAM-7(+)	TB-414-7+
RAM-8(+)	TB-414-8+
VAM-3(+)	TB-415-3+
VAM-6(+)	TB-415-6+
VAM-7(+)	TB-415-7+
ERA-1(+)	TB-431-1+
ERA-2(+)	TB-431-2+
ERA-3(+)	TB-431-3+
ERA-4(+)	TB-431-4+
ERA-5(+)	TB-431-5+
ERA-6(+)	TB-431-6+
MAR-1(+)	TB-432-1+
MAR-3(+)	TB-432-3+
MAR-4(+)	TB-432-4+
MAR-6(+)	TB-432-6+
MAR-8A(+)	TB-432-8A+