

# NB7N017MEVB

## NB7N017M Evaluation Board User's Manual



**ON Semiconductor®**

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### EVAL BOARD USER'S MANUAL

#### Description

This document describes the NB7N017M evaluation board and the appropriate lab test setups. It should be used in conjunction with the NB7N017M data sheet which contains full technical details on the device specification and operation. This evaluation board is offered as a convenience for the customers interested in performing their own engineering characterization and performance assessment of the NB7N017M. The board provides a high bandwidth 50  $\Omega$  controlled impedance environment.

The evaluation board is designed to facilitate a quick evaluation of the NB7N017M GigaComm™ 8-bit dual modulus programmable divider/prescaler. The current mode logic (CML) output ensures minimal noise and fast switching edges.

This evaluation board manual contains:

- Information on NB7N017MEVB Evaluation Board
- Appropriate Lab Test Setup
- Bill of Materials

#### What measurements can you expect to make?

With this evaluation board, the following measurements could be performed in single-ended or differential modes of operation:

- Jitter
- Frequency Response
- Output Rise and Fall Time

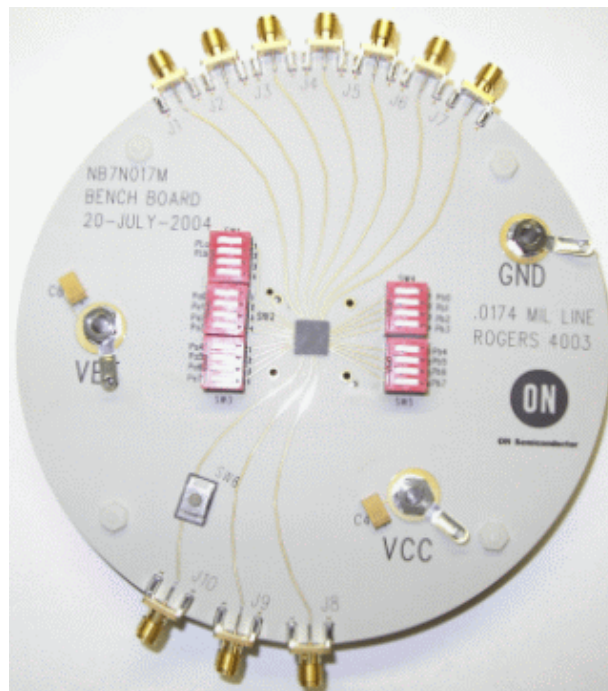


Figure 1. Evaluation Board Photo

# NB7N017MEVB

## Board Lay-Up

The NB7N017MEVB evaluation board is implemented in four layers (Figure 2, Evaluation Board Lay-up). The first layer or primary trace layer is 5 mil thick Rogers RO4003 material, which is designed to have equal electrical length on all signal traces from the device under the test (DUT) to the sense output. The second layer is the 1.0 oz copper ground plane. The FR4 dielectric material is placed between second and third layer and between third and fourth layer. The third layer is also 1.0 oz copper power plane. The fourth layer is the secondary trace layer.

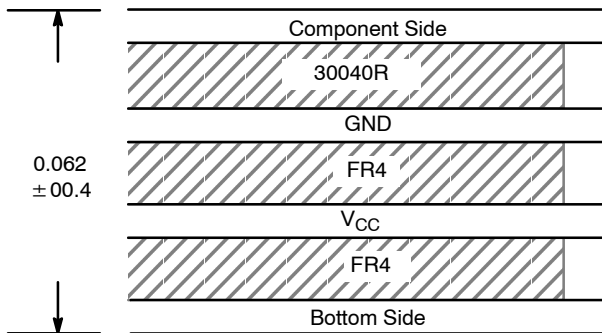
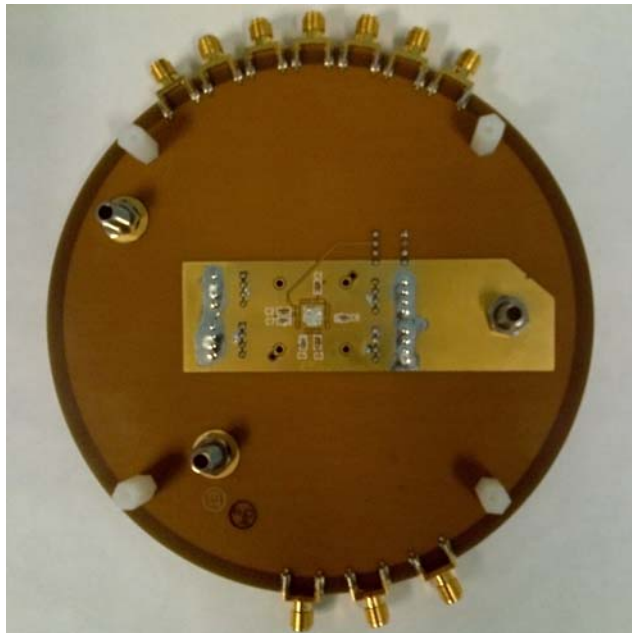


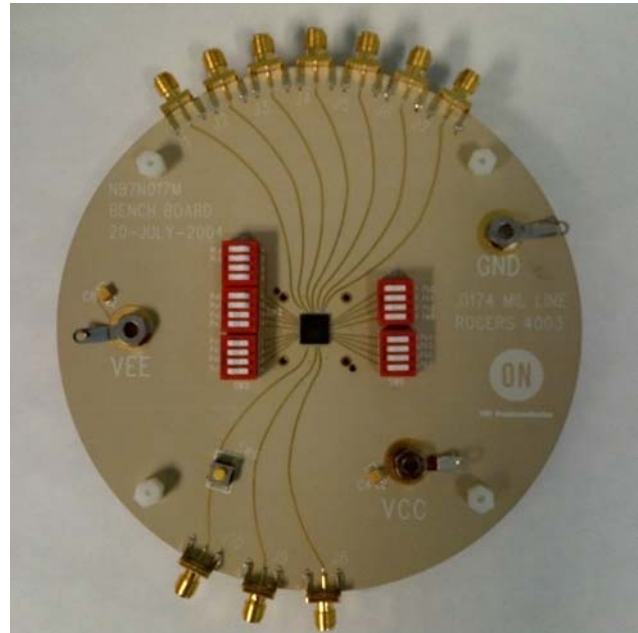
Figure 2. Evaluation Board Lay-Up

## Board Layout

The NB7N017MEVB evaluation board was designed to be versatile (see evaluation board schematic Figure 5). The input and output signal trace layout of the evaluation board is shown in Figure 3. The high-speed input and output pins are on a controlled 50  $\Omega$  impedance trace to an SMA connector. Other control pins (Pa[0:7] and Pb[0:7]) are connected to a switch for ease of programmability. The master RESET can either be controlled by a switch (SW6) or an input signal (J10).



(Bottom View)



(Top View)

Figure 3. Evaluation Board

# NB7N017MEVB

## Power Supplies

The NB7N017M is powered by  $|V_{CC} - V_{EE}| = 3.3$  V power supplies. For straightforward lab setup operation, negative voltages is recommended to enable the  $50\ \Omega$  internal impedance of the oscilloscope to be used as a termination for the CML signals ( $V_{CC} = 0.0$  V,  $V_{EE} = -3.3$  V and  $GND = 0.0$  V).

It is recommended to add capacitors (C4 and C8 are  $22\ \mu\text{F}$  and C1, C2, C3, C5, C6, and C7 are  $0.1\ \mu\text{F}$ ) to reduce the unwanted noise from the power supplies. Adding capacitors can improve the edge rates, reduce over shoot, and under shoot. Evaluation board provides several capacitor pads to add capacitors.

## Termination

CML outputs need to be terminated to  $V_{CC}$  via a  $50\ \Omega$  resistor. The input pins contain internal  $50\ \Omega$  resistors (VT pins). The VT pins are tied to  $V_{CC}$  which limits the input configuration of this device on this evaluation board.

NOTE: The test measurement device must contain  $50\ \Omega$  termination.

1. Connect appropriate power supplies. ( $V_{CC} = 0.0$  V,  $V_{EE} = -3.3$  V, and  $GND = 0.0$  V).
2. Connect input signals to the appropriate SMA connectors. Configure input signals according to the device data sheet.
3. Connect a test measurement device on the device output SMA connectors.

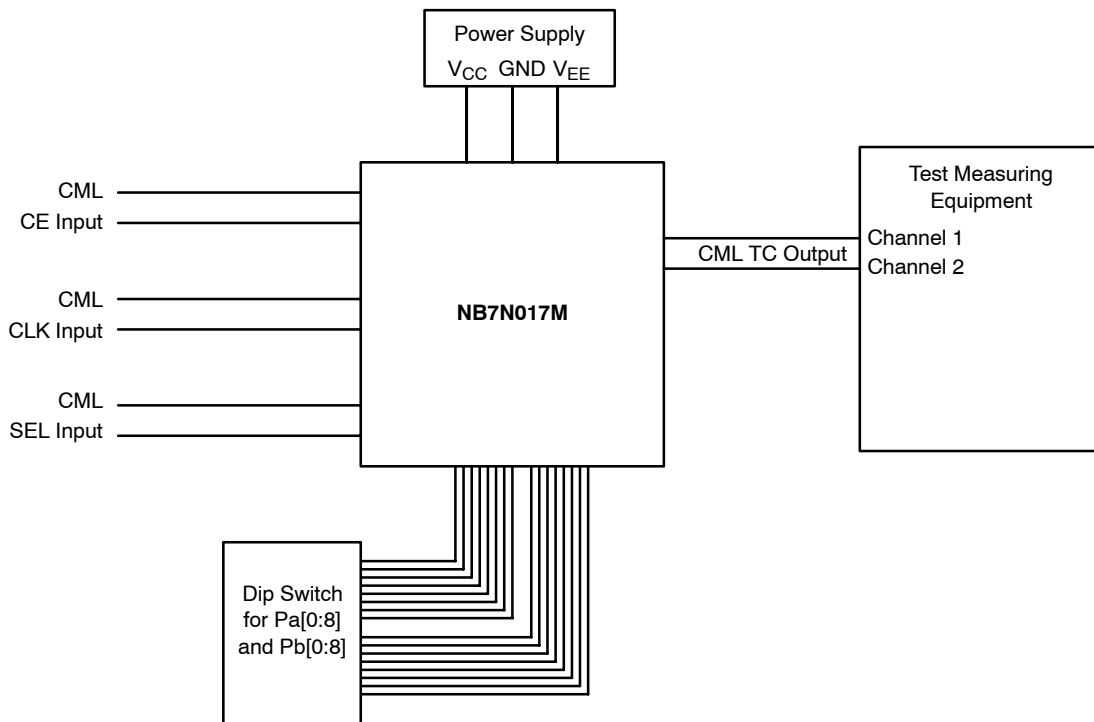


Figure 4. Typical Lab Setup

# NB7N017MEVB

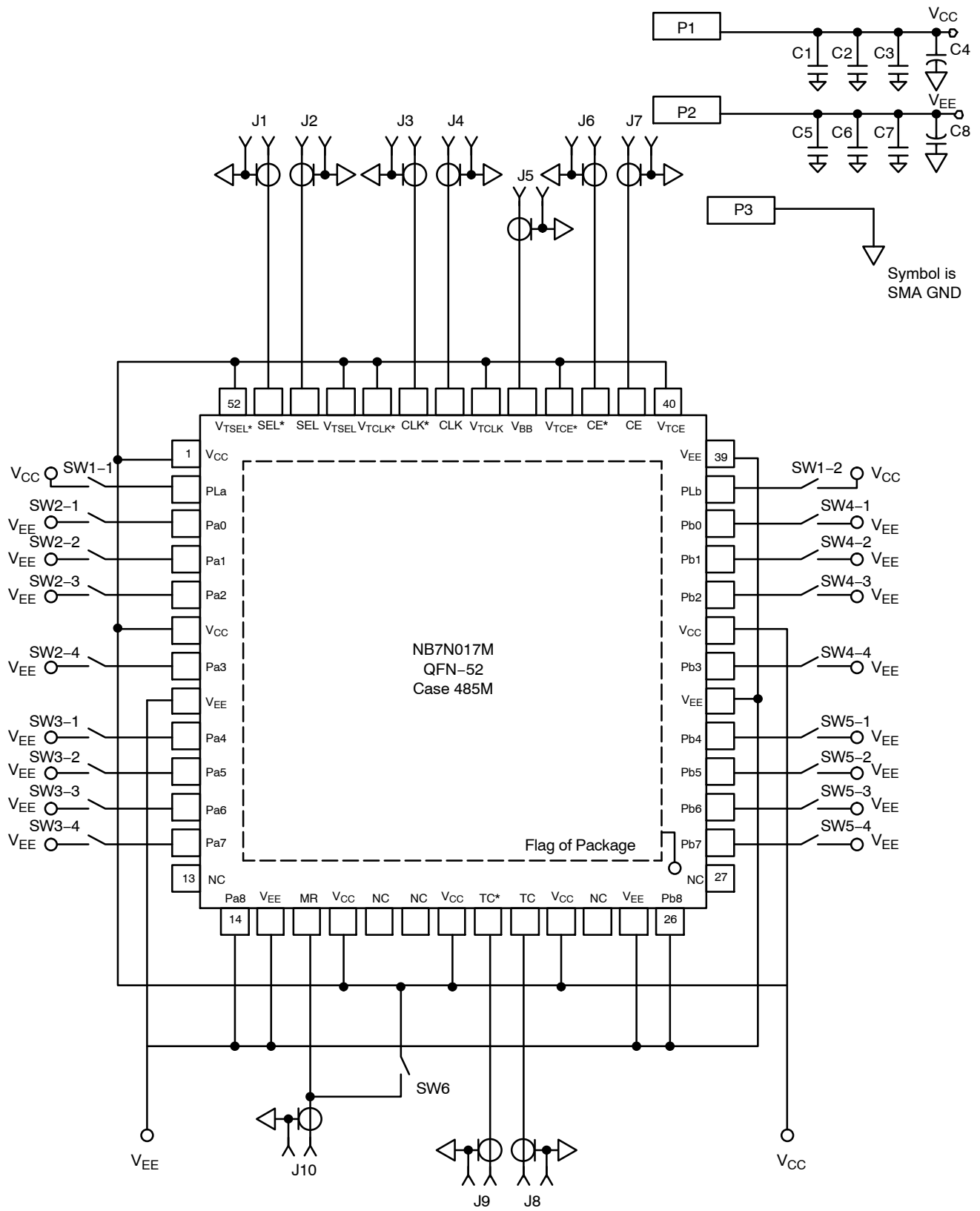


Figure 5. Evaluation Board Schematic


# NB7N017MEVB

**Table 1. BILL OF MATERIALS FOR NB7N017MEVB**

Components	Manufacturer	Description	Part Number	Web Site
SMA Connector	Johnson	SMA Connector, Side Launch, Gold Plated	142-0701-801	
Chip Capacitor	Kemet*	0603 0.1 $\mu$ F $\pm$ 10%	C0603C104K4RAC	www.newark.com
		22 $\mu$ F $\pm$ 10%	T491C226K016AS	
Banana Jack	SPC*	Banana Jack Female	813	www.newark.com
Evaluation Board	ON Semiconductor	NB7N017M Evaluation Board	NB7N017MEVB	http://www.onsemi.com
Device Samples	ON Semiconductor	3.3 V 8-bit Divider/Prescaler with CML Output	NB7N017M	http://www.onsemi.com
Switch	Grayhill	Dip Switch, 1 Position	765B04	
Switch	Grayhill	Momentary Switch	95C04A3GW	

\*Components are available through most distributors, i.e. www.newark.com, www.digikey.com

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