Description

M88TG0104A/B is a Clock Generator with one input reference clock, four programmable output pairs plus two LVCMOS reference outputs.

The chip utilizes Montage's advanced IO technology to generate a wide range of frequencies with excellent jitter performance for low phase noise spread-spectrum applications such as PCIe. It can source multiple 100MHz PCIe clock outputs. All differential clock outputs are compliant to PCIe Gen1/2/3/4/5/6 common clock and separate reference clock architecture specifications.

This chip supports the initialization through on-chip One-Time Programmable (OTP) configurations. These chip configuration can be partly or fully modified in working state according to the current control mode decided by a strapping pin at power-up stage, which easily realizes software selection of the desired configuration. Four programmable I^2C addresses are available, allowing easy I^2C access to multiple components.

Features

General

- 4-output programmable clock generator
- High jitter performance
- Working temperature: -40°C ~ 85°C
- Power supply: 1.8V to 3.3V
- Low power consumption
  - <150mW (1.8V with 100MHz LP-HCSL outputs)
- Input reference source option
  - M88TG0104A: external crystal or clock input
  - M88TG0104B: internal crystal

Input Reference Clock

- Single input source
  - Crystal input source
    - Internal crystal: 50MHz, or
    - External crystal: 8MHz ~ 50MHz
  - Clock input source
    - Frequency range: 1.22MHz ~ 250MHz
    - Acceptable input duty cycle: 40 ~ 60%

Output Clock

- 4 differential-pair outputs
- Output frequency range: 1MHz ~ 333.33MHz
- Support LVPECL and CML logic with easy AC coupling
- 2 LVCMOS reference clock outputs
- Support all three PCIe clocking architectures
  - Common Clocked (CC)
  - Independent Reference without spread spectrum (SRnS)
  - Independent Reference with spread spectrum (SRIS)
- Optional individual SSC setting for all output clocks; feedback fractional divider used by SSC for better jitter performance
- Programmable output impedance: 85Ω/100Ω or off

Control

- Three control modes selectable at power-on stage: I^2C mode, OTP mode, PIN mode
- Output clock dynamical control by multi-function pins
- Support up to 4 On-chip OTP configurations
- Four programmable I^2C addresses: D0, D2, D4, D6

Package

- M88TG0104A: 4.0mm x 4.0mm x 0.75mm, 0.5mm pitch, 24-pin VFQFPN
- M88TG0104B: 4.0mm x 4.0mm x 1.10mm, 0.5mm pitch, 24-pin LGA
- Package MSL: Level-3-260C

Key Specifications

- 260fs RMS 12kHz ~ 20MHz typical phase jitter at 100MHz
- 236fs RMS 12kHz ~ 20MHz typical phase jitter at 156.25MHz
- FFB PCIe Gen5 jitter (CC) typical 32fs RMS
- FOD PCIe Gen5 jitter (CC) typical 84fs RMS
- FFB PCIe Gen6 jitter (CC) typical 19fs RMS
- FOD PCIe Gen6 jitter (CC) typical 55fs RMS

Applications

- High-performance Computing (HPC)
- Storage, like SSD
- Ethernet
- Fiber Optic Modules
- NVLink

For more information on the product, please contact globalsales@montage-tech.com
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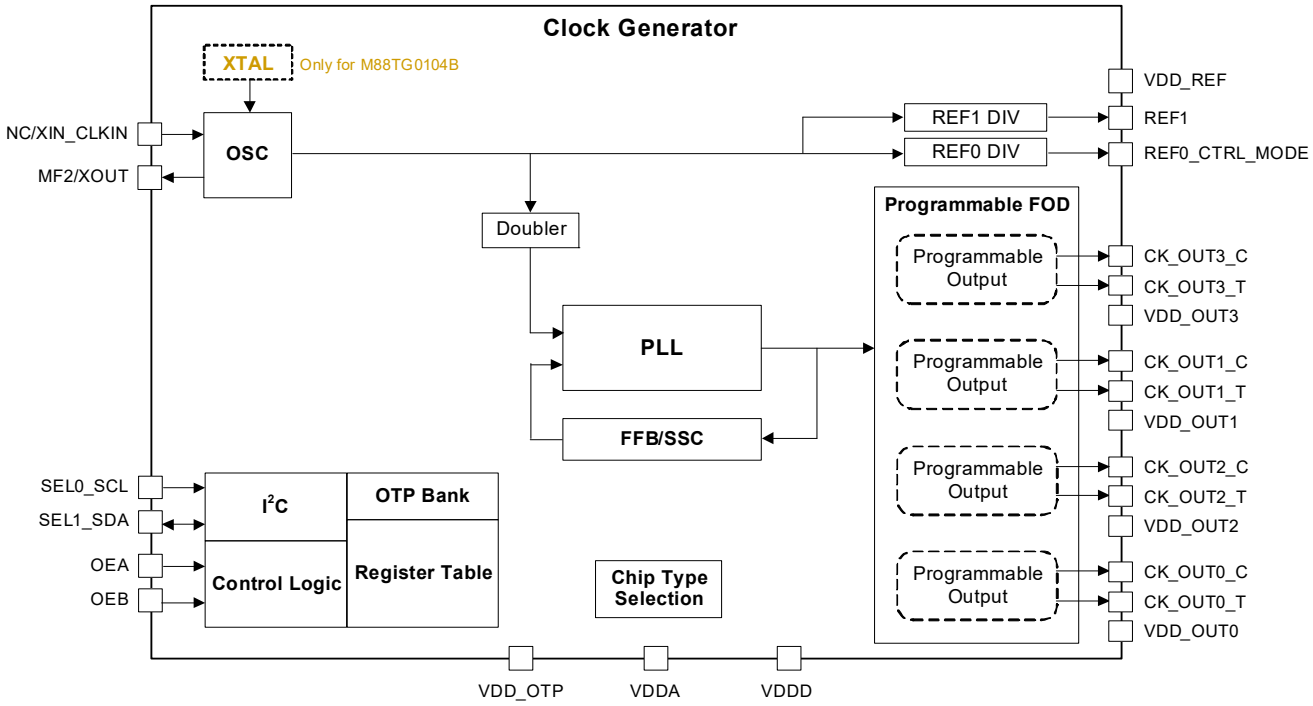
Functional Block Diagram

Figure 1. M88TG0104A/B Block Diagram



Notes:

1. *FFB: Fraction Feedback Divider*
   FOD: Fraction Output Divider
   IN DIV: Input Divider
   OTP: One-Time Programmable
   PLL: Phase Locked Loop
   SSC: Spread Spectrum Clocking
   XTAL: Crystal

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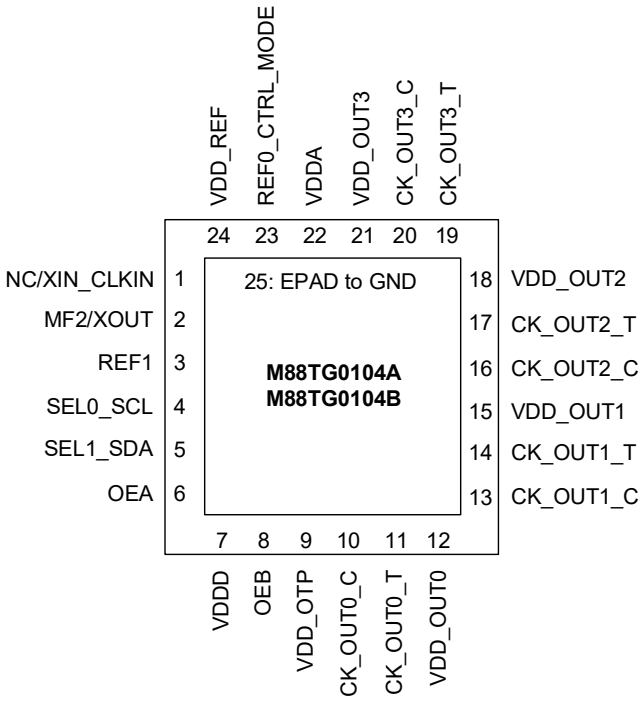
1 Pinout Diagram

Figure 2. 24-VFQFPN / 24-LGA Pin Assignment, 4.0mm x 4.0mm, 0.5mm Pitch (Top view)



2 Ordering Information

Part Number	Package	Temperature	Crystal	Packing
M88TG0104A-XX	4mm x 4mm x 0.75mm, 0.5 pitch 24-VFQFPN; MSL Level-3-260C	-40 ~ +85°C	External	Tray
M88TG0104A-XX-T				Tape & Reel
M88TG0104B-XX	4mm x 4mm x 1.10mm, 0.5 pitch 24-LGA; MSL Level-3-260C	-40 ~ +85°C	50MHz Internal	Tray
M88TG0104B-XX-T				Tape & Reel

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