UDC-28/39 Up/Down Converter

Product Specification

Version	Issue date	Changes	Remark
0.1	2024/2/26	Initial draft version	

IMPORTANT

This document contains important information and
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UDC-28/39 Up/Down Converter

1 Introduction

UDC-28/39 is a high bandwidth, low noise and distortion up/down converter that convert IF IN/OUT signals to and from RF OUT/IN signals. It is the best choice for applications, such as :

- Millimeter-wave 5G applications
- Point to point microwave radios
- Radar and electronic warfare systems
- Instrumentation and automatic test equipment (ATE)

2 Key Features

- Low EVM : < 2.8%
- Low LO frequency step : 1MHz typical, could be lower under request
- Single sideband up converter for suppressing the unwanted sideband
- Automatic crystal frequency calibration
- Firmware update through USB port
- SDK and example available for host application

3 Product Picture

4 Specification

- Output Frequency Range :
  - UDC-28 : 24 ~ 30 GHz
  - UDC-39 : 37 ~ 48 GHz
- Signal bandwidth :
  - One single signal having a bandwidth of 1 GHz
  - 10 signals of 100 MHz bandwidth combined together by a RF combiner
- Min and max frequency at the RF IN
  - 2000 ~ 4000 MHz
- LO frequency range:
  - UDC-28 : 22 ~ 28 GHz
  - UDC-39 : 35 ~ 46 GHz.
- LO frequency step :
  - 1MHz

- Number of RF Channels :
  - 2 Channel with both TX and RX for each channel
  - The LO frequency is the same for all 4 TX/RX ports
- Internal 10 MHz clock :
  - Initial frequency tolerance : ±300 ppb @25°C
  - Frequency stability of ±280 ppb over -40°C to +85°C
- CLOCK_IN and a CLOCK_OUT connectors
  - SMA female
  - > 500 mating cycles
- EVM :
  - < 2.8% full band
- Conversion gain(draft)
  - UDC-28
    - Up conversion : 23~27 dB
    - Down conversion : 10~14 dB
  - UDC-39
    - Up conversion : TBD dB
    - Down conversion : TBD dB
- Channel1 / Channel2 signals isolation :
  - UDC-28 : > 35 dB
  - UDC-39 : > 30 dB(draft)
- Power Consumption(draft)
  - < 1 A @ DC 12V
- Recommended signal power range (draft) :
  - IF
    - Input : -15 ~ -20 dBm
    - Output : -5 ~ -2 dBm
  - RF
    - Input : -15 ~ -20 dBm
    - Output :-5 ~ 0 dBm
- Host application interface for control and configuration :
  - USB type C port
  - Serial interface
    - Baud rate : 115200 bps
    - 8/N/1 protocol without flow control
    - Without input echo
- 4 IF ports configured as 2 TX and 2 RX
  - SMA female ports (1 port per channel)
  - > 500 mating cycles
- 4 FR2 RF ports :

- UDC-28 : 2.92mm female connector
- UDC-39 : 2.4mm female connector
- > 500 mating cycles

- Power supply :
  - 12V, 5.43A adaptor
  - Plug type configurable

5 Functional Block Diagram

The following shows the block diagram of UDC-28/39 :

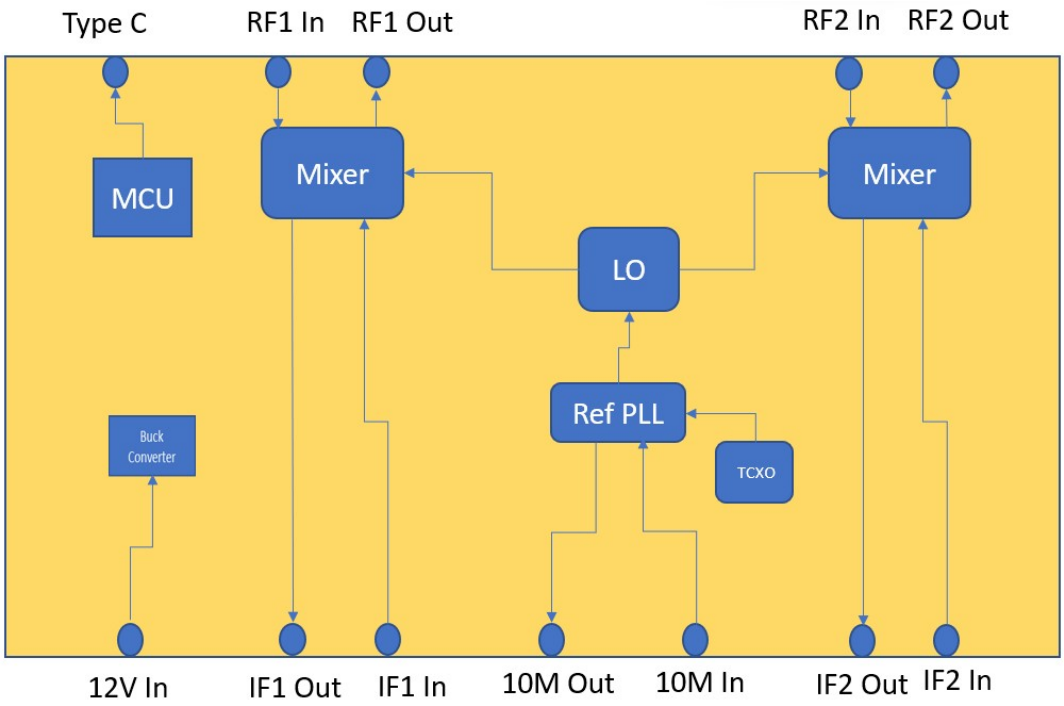

Figure 1: Functional Block Diagram

6 SDK

The SDK is a host controller example program written in python with following functions :

- Send console command to UDC
- Receive response from UDC and print response to console
- Update firmware

6.1 SDK installation and execution procedures :

- Install pyserial
- Make sure you are in the "root of the repository/stm32loader"
- Make sure PYTHONPATH includes "root of the repository"
- In Windows, set PYTHONPATH in : My Computer/System > Properties > Advanced System Settings > Environment Variables >
- Run program (COMx is the com port connecting to UDC console)
  - python main.py –p COMx
- Console command can be typed directly in the shell
- Response from UDC will be shown in the shell

6.2 Firmware update procedures :

- Put new firmware in the same directory with main.py
- Rename the new firmware as fw.bin
- Run SDK python program
- Type 'UpdateFw' command
- Power off and on the UDC device
- Wait for the prompt "Initing Clock" and then power off and on the UDC device again