ELECTRONICS
RJ ELECTRONICS CO., LTD

**Advanced Information**
**Ver. 0.2 Datasheet**

# RJ UTC Series

## RJ208 TX for all kind of DVR

## General Description

The RJ UTC ( Up The Coax ) series support CCTV camera OSD control via Coaxial cable by using remote controller.

This coaxial receiver and transmitter let our end-user enjoy more easy & simple way to install camera and control camera OSD.

## RJ102 – UTC Receiver

RJ102 will decode the command and send the command to CCTV ISP with GPIO standard. It's perfect for all kind of ISP.

## RJ208 – UTC Transmitter

RJ208 - UTC Transmitter
The RJ208 is a 8 channel DVR IR receiver for decoding the IR signal from remote controller, then send the IR decoded command to the Respective CCTV camera module which connected To DVR though by the coaxial cable.

## Product Features

- Small packaged IC
- Low cost
- Simple external component

## Application

- All kind od DVR solution
- CCTV OSD control by connected DVR

# RJ UTC Series

## RJ208 TX for all kind of DVR

### RJ208 Pin Description ( QFN 32 )

| SYMBOL | PIN | PAD | DESCRIPTION |
|---|---|---|---|
| NC | 1 | - | No Connect, Remain Float |
| NC | 2 | - | No Connect, Remain Float |
| VIDEO_1 | 3 | O | Video Output for Channel 1 |
| UTC_IN_1 | 4 | I/O | Clamped Video signal for Channel 1 |
| VIDEO_2 | 5 | O | Video Output for Channel 2 |
| UTC_IN_2 | 6 | I/O | Clamped Video signal for Channel 2 |
| VIDEO_3 | 7 | O | Video Output for Channel 3 |
| UTC_IN_3 | 8 | I/O | Clamped Video signal for Channel 3 |
| VIDEO_4 | 9 | O | Video Output for Channel 4 |
| UTC_IN_4 | 10 | I/O | Clamped Video signal for Channel 4 |
| VIDEO_5 | 11 | O | Video Output for Channel 5 |
| UTC_IN_5 | 12 | I/O | Clamped Video signal for Channel 5 |
| VIDEO_6 | 13 | O | Video Output for Channel 6 |
| UTC_IN_6 | 14 | I/O | Clamped Video signal for Channel 6 |
| VIDEO_7 | 15 | O | Video Output for Channel 7 |
| UTC_IN_7 | 16 | I/O | Clamped Video signal for Channel 7 |
| VIDEO_8 | 17 | O | Video Output for Channel 8 |
| UTC_IN_8 | 18 | I/O | Clamped Video signal for Channel 8 |

# RJ UTC Series

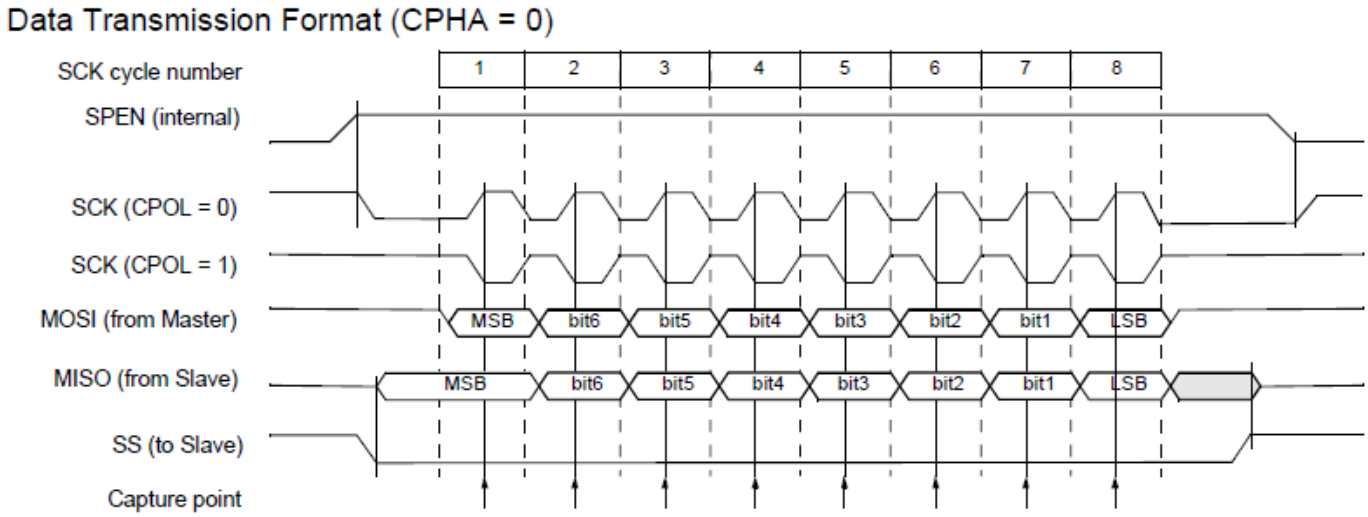
## RJ208 TX for all kind of DVR

### RJ208 Pin Description ( QFN 32 )

| SYMBOL | PIN | PAD | DESCRIPTION |
|---|---|---|---|
| VFB | 19 | I | Feedback voltage for adjusting the VOUT |
| VOUT | 20 | O | Regulated Video driving voltage |
| VDD | 21 | P | VDD Supply Voltage |
| GND | 22 | P | Ground |
| IR_IN | 23 | I | Received IR signal from Remo-con<br>Default: Internal 450K resistor pull high |
| MS | 24 | I | 0: slave mode, 1: master mode<br>Default: Internal 450K resistor pull high |
| DIN | 25 | I | When Master mode, DIN should be float.<br>When slave mode, DIN will be serial interface data input<br>Default: Internal 450K resistor pull high |
| DCLK | 26 | I/O | When master mode, DCLK will output 100KHz to slave<br>When slave mode, DCLK will be input<br>Default: Internal 450K resistor pull low |
| LOAD | 27 | I/O | When master mode, LOAD will be output<br>When slave mode, LOAD will be input<br>Default: Internal 450K resistor pull high |
| DOUT | 28 | O | Serial interface data output to cascading slave device |
| SPI_MISO | 29 | O | SPI data output to Master |
| SPI_MOSI | 30 | I | SPI data input from Master<br>Default: Internal 450K resistor pull high |
| SPI_SCLK | 31 | I | SPI clock input<br>Default: Internal 450K resistor pull high |
| SPI_CS | 32 | I | SPI slave select<br>Default: Internal 450K resistor pull high |

## SPI Communication between DVR and RJ208 Master IC

### Communication Standard: 8bit SPI(CPOL=0,CPHA=0)




### Command Table

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | Description |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NULL for MISO checking |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Channel 1 |
| | | | | | | | | ... |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | Channel 64 |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | UP |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | LEFT |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | CENTRE |
| 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | RIGHT |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | DOWN |
| 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | No Command |

## SPI Communication between DVR and RJ208 Master IC

### SPI Command Sequence

1. Select Channel 3, send Channel command
   "0000 0011" -> Select Channel 3
2. Select Centre command, send Key command
   "0100 1100" -> Channel 3 will output Centre
3. Select Up command, send Key command
   "0100 1010" -> Channel 3 will output Up
4. Select Channel 4, send Channel command
   "0000 0100" -> Select channel 4, all channels will not output any command
5. Select Centre command, send Key command
   "0100 1100" -> Channel 4 will output Centre
6. Select No command, send Key command
   "0100 1111" -> Channel 4 will not output any command

## Absolute Maximum Ratings

| Parameter | Symbol | Condition | MIN | MAX | Unit |
|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | | -0.5 | 6 | V |
| Supply Current | $I_{DD}$ | $V_{DD}$ = 3V, no Load | -50 | 50 | mA |
| Input Voltage | $V_{IN}$ | | GND-0.3 | $V_{DD}$ +0.3 | V |
| Output Voltage | $V_{OUT}$ | | GND-0.3 | $V_{DD}$ +0.3 | V |
| DC input Current | $I_{IN}$ | | -10 | 10 | mA |
| DC output Current | $I_{OUT}$ | | -10 | 10 | mA |
| Operating Temperature | $T_{stg}$ | | -40 | 85 | °C |
| Storage Temperature | $T_{stg}$ | | -65 | 150 | °C |
| Total Power Dissipation | $P_{tot}$ | | - | 400 | mW |

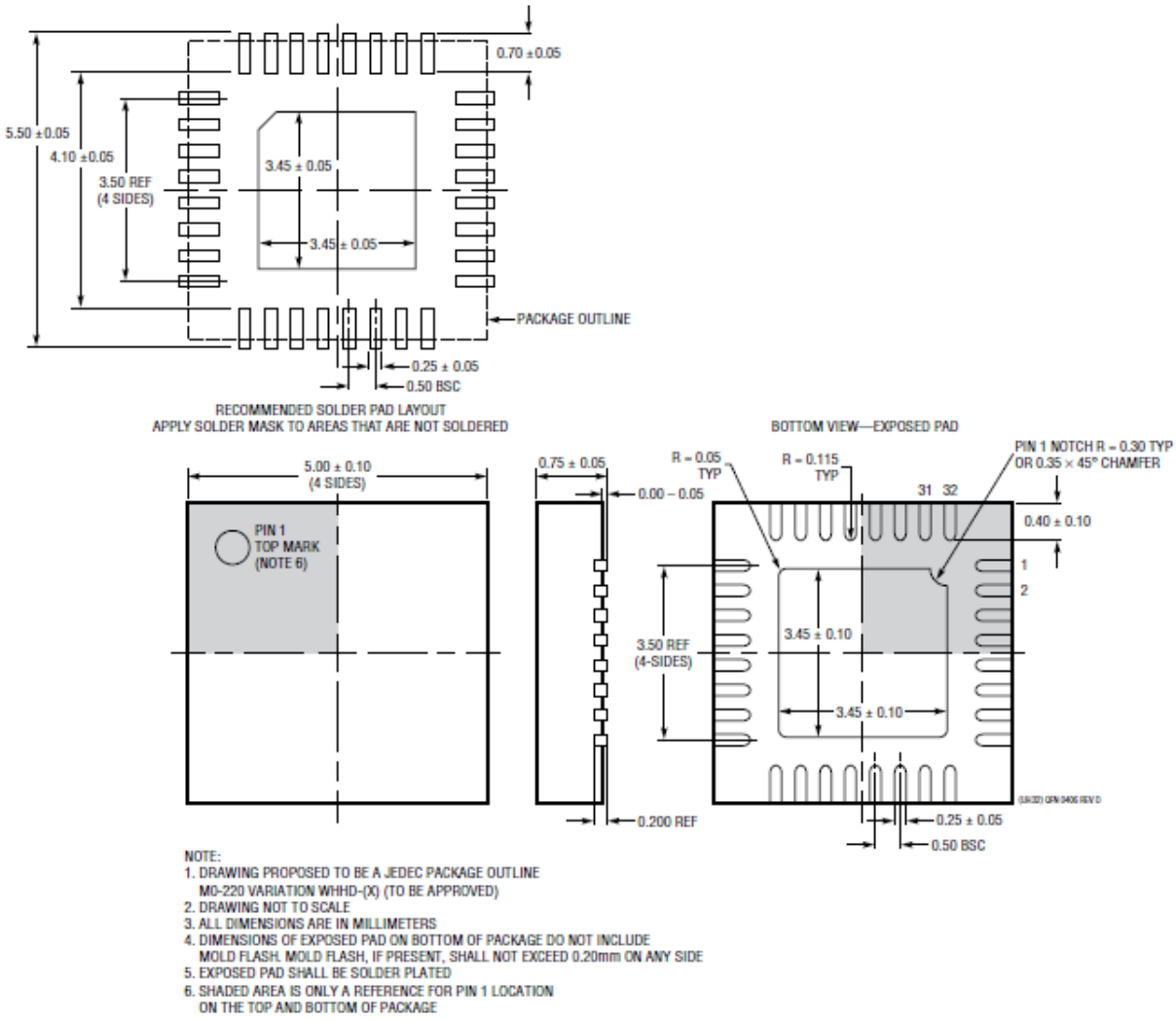
## DC Characteristic

| Parameter | | Symbol | Condition | MIN | TYP | MAX | Unit |
|---|---|---|---|---|---|---|---|
| Supplies | Supply Voltage | $V_{DD}$ | | 3.0. | - | 3.6 | V |
| | Operating Current | Iopt | Operating Mode | - | 10 | | mA |
| Logic | LOW-level Input Voltage | $V_{IL}$ | | GND | - | 0.3*$V_{DD}$ | V |
| | HIGH-level Input Voltage | $V_{IH}$ | | 0.7*$V_{DD}$ | - | $V_{DD}$ | V |
| | LOW-level Output Current | $I_{OL}$ | $V_{OL}$ = 1.0V | 1 | - | - | mA |
| | HIGH-level Output Current | $I_{OH}$ | $V_{OH}$ = 2.0V | -1 | - | - | mA |

**$V_{DD}$ = 3.0V; $T_{amb}$ = 25°C ; unless otherwise specified**

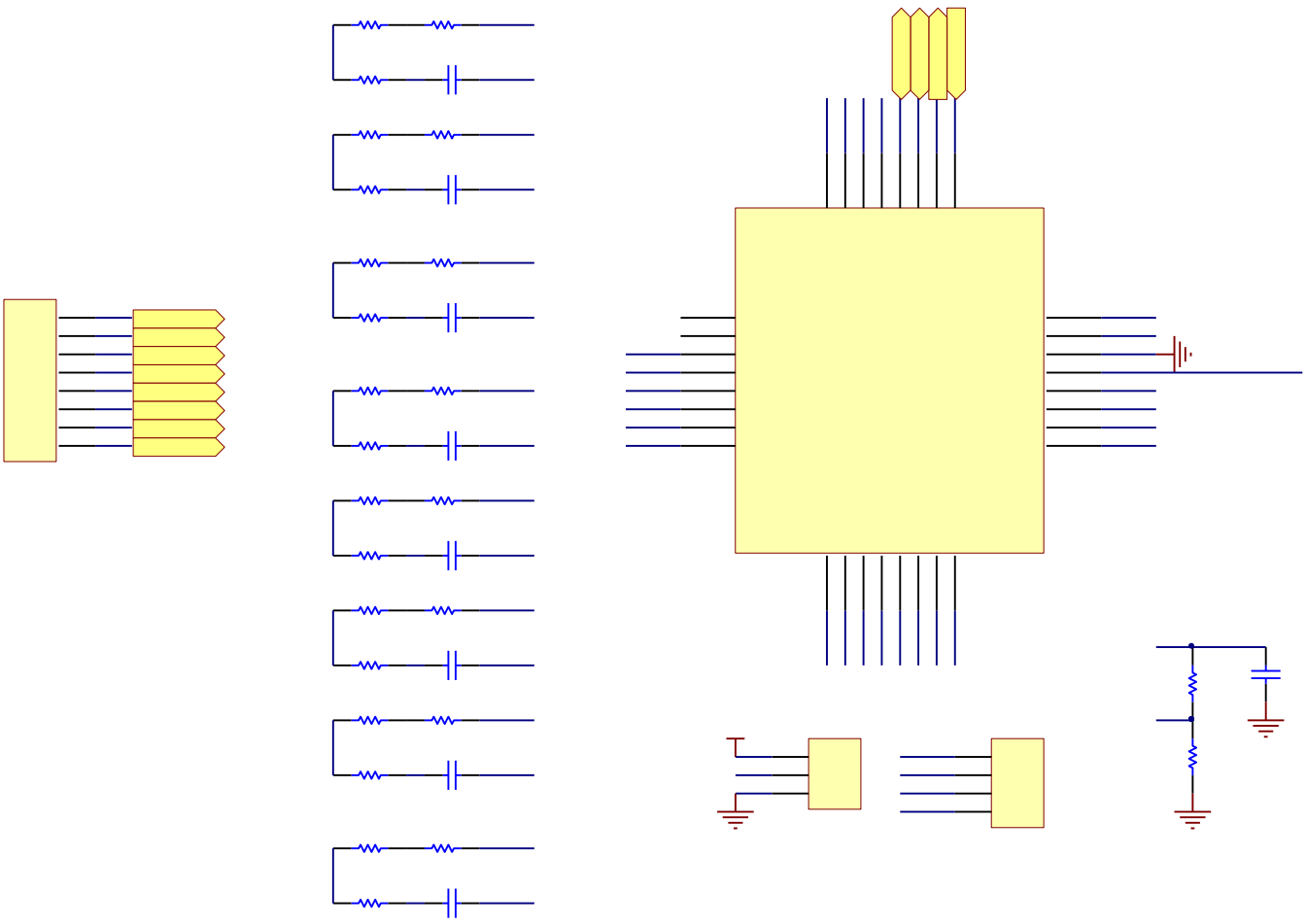
## RJ208 Package Dimension ( QFN 32 )

**UH Package**
**32-Lead Plastic QFN (5mm × 5mm)**
(Reference LTC DWG # 05-08-1693 Rev D)

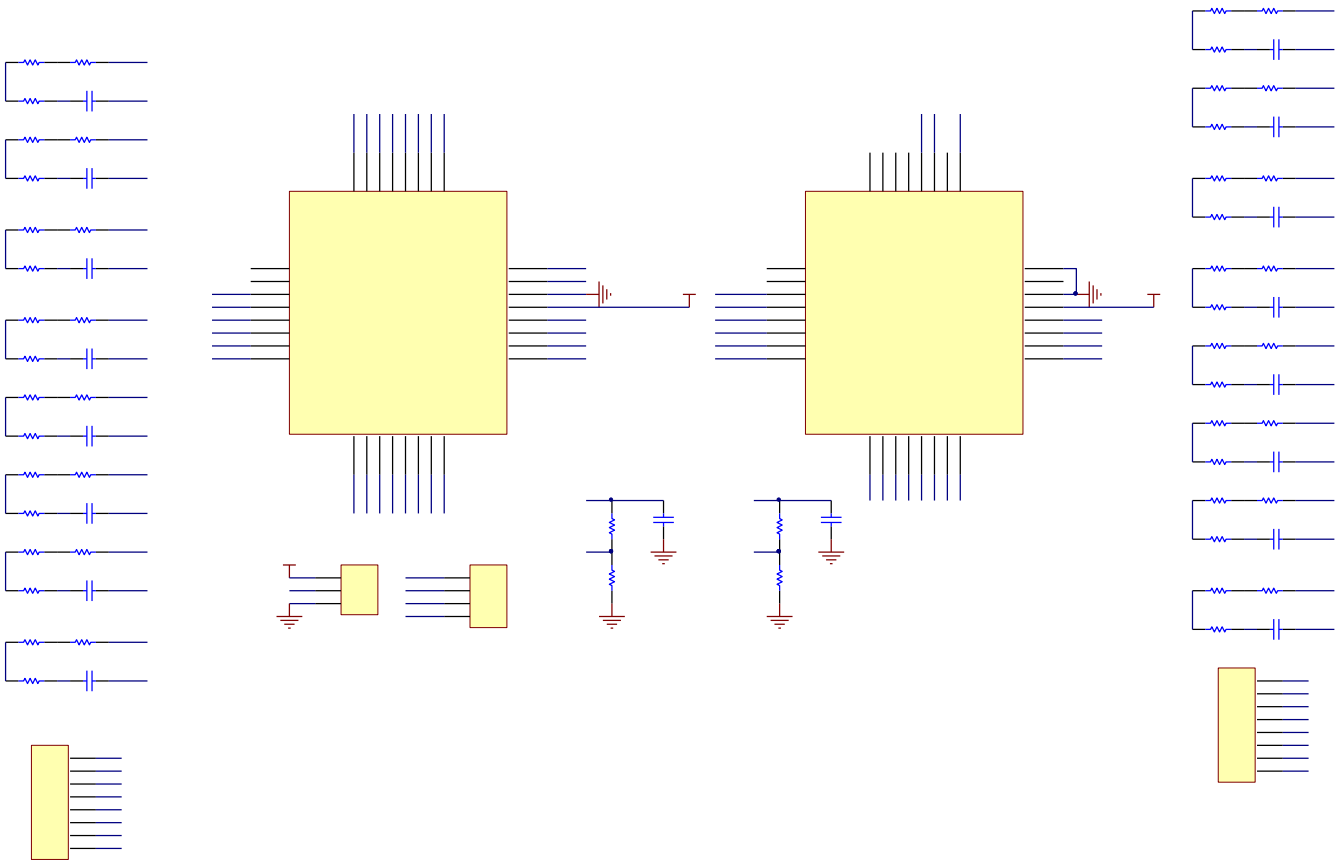



NOTE:
1. DRAWING PROPOSED TO BE A JEDEC PACKAGE OUTLINE
   M0-220 VARIATION WHHD-(X) (TO BE APPROVED)
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE
   MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.20mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION
   ON THE TOP AND BOTTOM OF PACKAGE

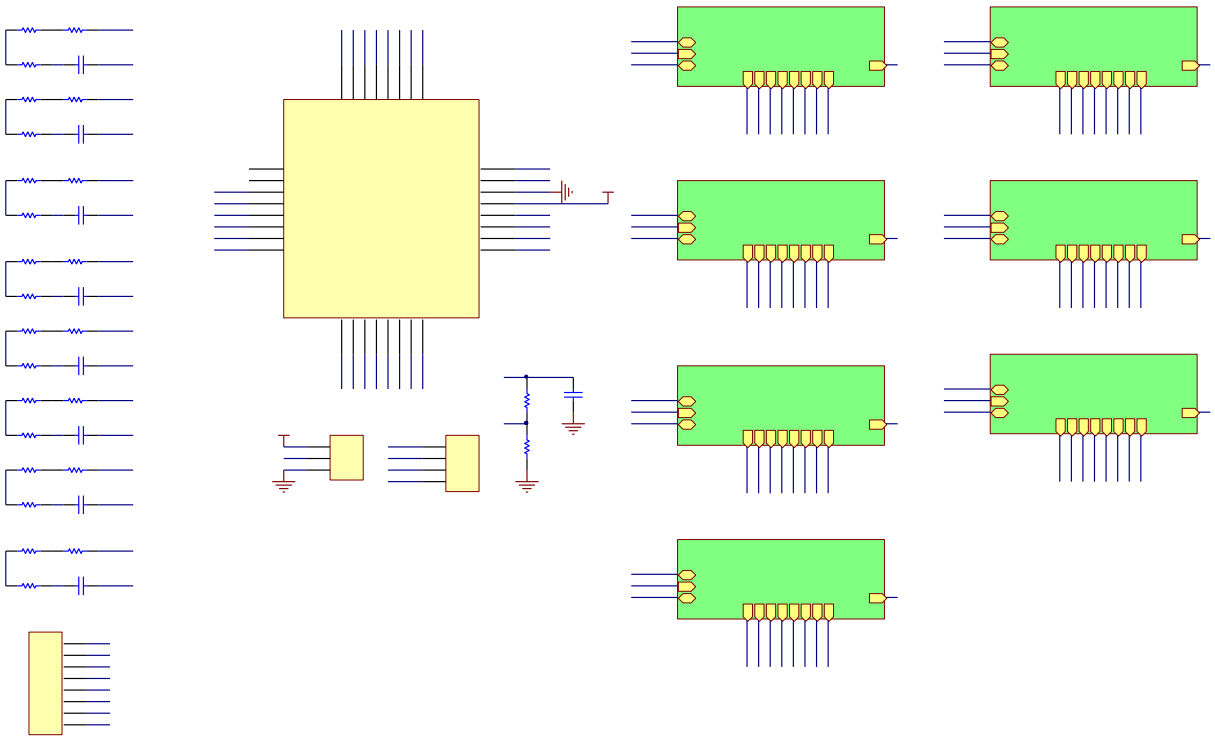
## Application circuit (Master 8 channels)



## Application circuit (Master Slave 16 Channels)



## Application circuit (64 Channels – Master Circuit)



## Application circuit (64 Channels – Slave circuit)