

**MPC8260 PowerQUICC II  
MPC8260-TCOM User's Manual**

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**0•1 INTRODUCTION**

This page provides unpacking instructions, hardware preparation, and installation instructions for the MPC8260TCOM.

**0•2 UNPACKING INSTRUCTIONS****NOTE**

If the shipping carton is damaged upon receipt, request carrier's agent be present during unpacking and inspection of equipment.

Unpack equipment from shipping carton. Refer to packing list and verify that all items are present. Save packing material for storing and reshipping of equipment.

**CAUTION**

AVOID TOUCHING AREAS OF INTEGRATED CIRCUITRY; STATIC DISCHARGE CAN DAMAGE CIRCUITS.

## CHAPTER 1 - GENERAL INFORMATION

### 1•1 INTRODUCTION

This manual provides general information, preparation for use and installation instructions, operating instructions, functional description, and support information for the MPC8260TCOM board.

### 1•2 FEATURES

The main features of the MPC8260TCOM board are as follows:

- Two Fast Ethernet channels connected guilelessly to the Level One LXT970 device.
- The 2 Fast-Ethernet use FCC1 and FCC3.
- Each one of the Fast - Ethernet module can be disable/disable and controlled by SW.
- Two DS3 channels using the TRAN-SWITCH TXC-03401 FRAMER and TRAN-SWITCH TXC-20153G DS3 Line Interface Module.
- Each one of the DS3 framer controlled via the MPC8260.
- The 2XDS3 use the TDMA1(DS3\_1 FCC2) and TDMA2 (DS3\_2 FCC3).
- Each one of the DS3 module can be disable/enable by HW.
- Eight T1 interfaces using MCC1 and MCC2.
- The 8 x T1 use the TOCTL PM4388 as a framer and 2 x PM4314 as a line interface module, both controlled by the MPC8260.
- Each one of the eight T1 can be independently configured, monitor, isolated and controlled by SW.
- The TOCTL (PM4388) is controlled by the MPC8260 via the address and data bus.
- The MPC8260TCOM board is powered and controlled by the MPC8260ADS via 2 x 128pin DIN connectors.

### 1•3 SPECIFICATIONS

The MPC8260TCOM specifications are given in Table 1-1.

**Table 1-1 MPC860SAR-PHY Specifications**

| CHARACTERISTICS                               | SPECIFICATIONS                                    |
|---|---|
| Power requirements (no other boards attached) | +5Vdc @ 2 A (typical), 2.5 A (maximum)            |
| Operating temperature                         | 0 degrees to 30 degrees C ambient air temperature |
| Storage temperature                           | -25 degrees to 85 degrees C                       |
| Relative humidity                             | 5% to 90% (non-condensing)                        |
| Dimensions                                    |   |
| Height  | 9.17 inches (233 mm)                              |
| Depth   | 6.3 inches (160 mm)                               |
| Thickness                                     | 0.063 inches (1.6 mm)                             |

## 1•4 GENERAL DESCRIPTION

The MPC8260TCOM Board includes the following modules: 8 x T1/E1, 2 x Fast Ethernet, 2 x DS3.

The MPC8260ADS includes the following modules: ATM155 and Fast Ethernet.

Both MPC8260TCOM and MPC8260ADS implements the following network for H/W & S/W development applications:

ATM155M (FCC1 on MPC8260ADS) + 8 x T1 (MCC1 & MCC2),

ATM155M (FCC1 on MPC8260ADS) + 2 x Fast Ethernet (FCC2 on MPC8260ADS, FCC3),

ATM155M (FCC1 on MPC8260ADS) + 2 x DS3 (TDMa1 to FCC2, TDMa2 to FCC3),

3 x Fast Ethernet (FCC2 on MPC8260ADS, FCC1, FCC3).

**NOTE:** Some modules share the same GPIO. Care must be taken when configuring each one of the modules, to prevent a conflict between them. Before operating the board the user should define the modes of operation and configure the MPC8260 GPIO to the corresponding module.

**Special care must be taken when using the Fast Ethernet interfaces. It do not have a h/w enable signal, it is configured only through the MII MDC,MDIO signals.**

## 1•5 RELATED DOCUMENTATION

The following publications are applicable to the MPC8260TCOM and may provide additional helpful information.

- MPC8260 Spec.
- MPC-SIERRA TOCTL PM4388. (<http://www.pmc-sierra.com/register/toctl.asp#D>)
- MPC-SIERRA QDSX PM4314. (<http://www.pmc-sierra.com/register/qdsx.asp#D>)
- Level-One LXT970 Fast - Ethernet Transceiver. (<http://www.level1.com/product/qa/lxt970qa.html>)
- TRAN-SWITCH TXC-03401 DS3 FRAMER. (<http://www.transwitch.com/pdh.html#ds3f>)
- TRANS-SWITCH TXC20153G DS3 Line Interface Module. (<http://www.transwitch.com/pdh.html#limsn>)
- TRANS-SWITCH TXC020020 DS3 Line Interface Device. (<http://www.transwitch.com/pdh.html#>)

## 1•6 ABBREVIATIONS USED IN THE DOCUMENT

- FCC - Fast serial Communication Controller.
- MCC - Multi Channel Controller.
- FE - Fast Ethernet.
- TOCTL - PMC-Sierra framer PM4388.
- LIU - Line interface module.
- QDSX - PMC-sierra LIU PM4314.
- DS3 - Serial communication of 44.736Mbps.
- DS3F - DS3 Framer.
- TCOM - MPC8260TCOM Board
- GPIO - General Purpose I/O related to the MPC8260 PORTS.
- ADS - MPC8260ADS
- Module - Each one of the options this board can give: 8 x T1, 2 x FE, 2 x DS3.
- CPM - Communication Processor Module.
- SPEC - Engineering Specification document.

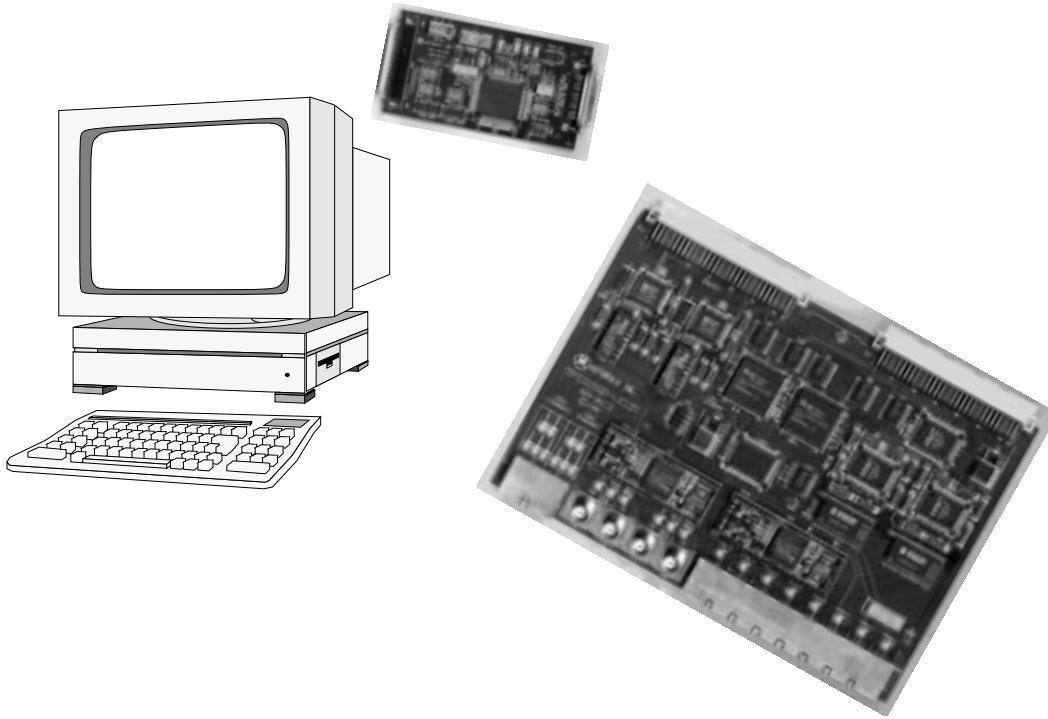
## 1•7 REQUIRED EQUIPMENT

The MPC8260TCOM operates only with the MPC8260ADS.

The equipment required to connect the communication lines to the two cards is described below:

- The RJ45 connectors are separated to two groups:
- 8 x E1/T1 circuit connected by a 8 wires cable.
- 2 x Fast Ethernet circuit connected by a 8 wires cable.
- 4 x BNC 75Ω dedicated to 2 x DS3 circuit connected by a BNC cable. (2 - receive, 2 - transmit)

**FIGURE 1-1 MPC8260TCOM Connections.**



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## CHAPTER 2 - SOFTWARE AND HARDWARE PREPARATION

### 2•1 SOFTWARE PREPARATION

The TCOM is not a stand alone board. It should be connected to the MPC8260ADS. To select the desired configuration and ensure proper operation of the MPC8260TCOM board, changes in the MPC8260 GPIO configuration may be required. The following table describes the different configurations of all the modules on the board.

**NOTE:**

The FE modules have no H/W protection. Before using one of the FE module make sure that other modules using the same GPIO are disabled. The following table shows the various types of communication channels that can be implemented by connecting the TCOM & ADS cards.

The I/O are related to the MPC8260.

The dark column are the modules on the ADS.

**Table 2: Ports Function Signals**

| Ports/name                            | T1<br>1<br>A1 | T1<br>2<br>B1 | T1<br>3<br>C1 | T1<br>4<br>D1 | T1<br>5<br>A2 | T1<br>6<br>B2 | T1<br>7<br>C2 | T1<br>8<br>D2 | ADS<br>ATM8 | FE<br>1<br>FCC1 | ADS<br>FE 0<br>FCC2 | FE<br>2<br>FCC3 | TDM1<br>DS3<br>1<br>FCC2 | TDM2<br>DS3<br>2<br>FCC3 |
|---------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|-----------------|---------------------|-----------------|--------------------------|--------------------------|
| PA2/DS3-TXCLK/TDM2-TXCLK(clock20)     |               |               |               |               |               |               |               | I             |             |                 |                     |                 | I                        |                          |
| PA6/DS3-RXSYNC/TDMA1-LIRSYNC          | I             |               |               |               |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PA7/DS3-TXSYNC/TDMA1-LITSYNC          | I             |               |               |               |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PA8/DS3-RXD0/TDMA1-L1RXD0             | I             |               |               |               |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PA9/DS3-TXD0/TDMA1-L1TXD0             | O             |               |               |               |               |               |               |               |             |                 |                     |                 | O                        |                          |
| PA14/MIIRXD3/ATM8-RXD4                |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA15/MIIRXD2/ATM8-RXD5                |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA16/MIIRXD1/ATM8-RXD6                |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA17/MIIRXD0/ATM8-RXD7                |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA18/MIITXD0/ATM8-TXD7                |               |               |               |               |               |               |               |               | O           | O               |                     |                 |                          |                          |
| PA19/MIITXD1/ATM8-TXD6                |               |               |               |               |               |               |               |               | O           | O               |                     |                 |                          |                          |
| PA20/MIITXD2/ATM8-TXD5                |               |               |               |               |               |               |               |               | O           | O               |                     |                 |                          |                          |
| PA21/MIITXD3/ATM8--TXD4               |               |               |               |               |               |               |               |               | O           | O               |                     |                 |                          |                          |
| PA26/MIIRXER/ATM8-RxClav              |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA27/MIIRXDV/ATM8-RxSOC               |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA28/MIITXEN/ATM8-RxEnb               |               |               |               |               |               |               |               |               | O           | O               |                     |                 |                          |                          |
| PA29/MIITXER/ATM8-TxSOC               |               |               |               |               |               |               |               |               | O           | O               |                     |                 |                          |                          |
| PA3/DS3-RXD1/TDM2-RXCLK(clock19)      |               |               |               |               |               |               |               | I             |             |                 |                     |                 |                          | I                        |
| PA30/MIICRS/ATM8-TxClav               |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PA31/MIICOL/ATM8-TxEnb                |               |               |               |               |               |               |               |               | O           | I               |                     |                 |                          |                          |
| PB4/MIITXD3/DS3-RXSYNC/TDMA2-LIRSYNC  |               |               |               |               | I             |               |               |               |             |                 |                     |                 | O                        | I                        |
| PB5/MIITXD2/DS3-TXSYNC//TDMA2-LITSYNC |               |               |               |               | I             |               |               |               |             |                 |                     |                 | O                        | I                        |
| PB6/MIITXD1/DS3-RXD0/TDMA2-L1RXD0     |               |               |               |               | I             |               |               |               |             |                 |                     |                 | O                        | I                        |
| PB7/MIITXD0/DS3-TXD0/TDMA2-L1TXD0     |               |               |               |               | O             |               |               |               |             |                 |                     |                 | O                        | O                        |
| PB8/MIIRXD0/TDM1-LIRSYNC              |               |               |               | I             |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PB9/MIIRXD1/DS3-TXD2/TDM1-LITSYNC     |               |               |               | I             |               |               |               |               |             |                 |                     |                 | I                        | O                        |
| PB10/MIIRXD2/TDM1-L1RXD               |               |               |               | I             |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PB11/MIIRXD3/TDM1-L1TXD               |               |               |               | O             |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PB12/MIICRS/TDM1-LIRSYNC              |               |               | I             |               |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PB13/MIICOL/DS3-TXD1/TDM1-LITSYNC     |               |               | I             |               |               |               |               |               |             |                 |                     |                 | I                        | O                        |
| PB14/MIITXEN/TDM1-L1RXD               |               |               | I             |               |               |               |               |               |             |                 |                     |                 | O                        |                          |
| PB15/MIITXER/TDM1-L1TXD               |               |               | O             |               |               |               |               |               |             |                 |                     |                 | O                        |                          |
| PB16/MIIRXER                          |               |               |               |               |               |               |               |               |             |                 |                     |                 | I                        |                          |

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**Table 2: Ports Function Signals**

| Ports/name                                  | T1<br>1<br>A1 | T1<br>2<br>B1 | T1<br>3<br>C1 | T1<br>4<br>D1 | T1<br>5<br>A2 | T1<br>6<br>B2 | T1<br>7<br>C2 | T1<br>8<br>D2 | ADS<br>ATM8 | FE<br>1<br>FCC1 | ADS<br>FE 0<br>FCC2 | FE<br>2<br>FCC3 | TDM1<br>DS3<br>1<br>FCC2 | TDM2<br>DS3<br>2<br>FCC3 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|-----------------|---------------------|-----------------|--------------------------|--------------------------|
| PB17/MIIRXDV                                |               |               |               |               |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PB18/DS3-RXD2/MIIRXD3                       |               |               |               |               |               |               |               |               |             |                 | I                   |                 |                          | I                        |
| PB19/DS3-RXD3/MIIRXD2                       |               |               |               |               |               |               |               |               |             |                 | I                   |                 |                          | I                        |
| PB20/DS3-TXD1/TDM2-L1RSYNC/MIIRXD1          |               |               |               |               |               |               |               | I             |             |                 | I                   |                 | O                        |                          |
| PB21/DS3-TXD2/TDM2-L1TSYNC/MIIRXD0          |               |               |               |               |               |               |               | I             |             |                 | I                   |                 | O                        |                          |
| PB22/DS3-RXD1/TDM2-L1RXD/MIITXD0            |               |               |               |               |               |               |               | I             |             |                 | O                   |                 | I                        |                          |
| PB23/DS3-RXD2/TDM2-L1TXD/MIITXD1            |               |               |               |               |               |               |               | O             |             |                 | O                   |                 | I                        |                          |
| PB24/DS3-RXD3/TDM2-L1RSYNC/MIITXD2          |               |               |               |               |               |               | I             |               |             |                 | O                   |                 | I                        |                          |
| PB25/DS3-TXD3/TDM2-L1TSYNC/MIITXD3          |               |               |               |               |               |               | I             |               |             |                 | O                   |                 | O                        |                          |
| PB26/TDM2-L1RXD/MIICRS                      |               |               |               |               |               |               | I             |               |             |                 | I                   |                 |                          |                          |
| PB27/TDM2-L1TXD/MIICOL                      |               |               |               |               |               |               | O             |               |             |                 | I                   |                 |                          |                          |
| PB28/TDM2-L1TSYNC/MIIRXER                   |               |               |               |               |               | I             |               |               |             |                 | I                   |                 |                          |                          |
| PB29/TDM2-L1RSYNC/MIITXEN                   |               |               |               |               |               | I             |               |               |             |                 | O                   |                 |                          |                          |
| PB30/TDM2-L1RXD/ATM8-MIIRXDV                |               |               |               |               |               | I             |               |               |             |                 | I                   |                 |                          |                          |
| PB31/TDM2-L1TXD/MIITXER                     |               |               |               |               |               | O             |               |               |             |                 | O                   |                 |                          |                          |
| PC9/MIIMDIO                                 |               |               |               |               |               |               |               |               |             | X               | X                   | X               |                          |                          |
| PC10/MIIMDC                                 |               |               |               |               |               |               |               |               |             | X               | X                   | X               |                          |                          |
| PC11/DS3-TXD3                               |               |               |               |               |               |               |               |               |             |                 |                     |                 |                          | O                        |
| PC16/MIITXCLK(clock16)/TDM2-TXCLK           |               |               |               |               |               | I             |               |               |             |                 |                     |                 | I                        |                          |
| PC17/MIIRXCLK(clock15)/TDM2-RXCLK           |               |               |               |               |               | I             |               |               |             |                 |                     |                 | I                        |                          |
| PC18/TDMA2-TXCLK(clock14)/MIITXCLK          |               |               |               |               | I             |               |               |               |             |                 | I                   |                 |                          |                          |
| PC19/TDMA2-RXCLK(clock13)/MIIRXCLK          |               |               |               |               | I             |               |               |               |             |                 | I                   |                 |                          |                          |
| PC20/MIITXCLK(clock12)/ATM8-TxClk           |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PC21/MIIRXCLK(clock11)/ATM8-RxClk           |               |               |               |               |               |               |               |               | I           | I               |                     |                 |                          |                          |
| PC22/TDM1-TXCLK(clock10)                    |               | I             |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |
| PC23/TDM1-RXCLK(clock9)                     |               | I             |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |
| PC24/TDM1-TXCLK(clock8)                     |               |               |               | I             |               |               |               |               |             |                 |                     |                 |                          |                          |
| PC25/TDM1-RXCLK(clock7)                     |               |               |               | I             |               |               |               |               |             |                 |                     |                 |                          |                          |
| PC26/DS3-TXCLK(clock6)/TDM1-L1TXCLK(clock6) |               |               |               | I             |               |               |               |               |             |                 |                     |                 |                          | I                        |
| PC27/DS3-RXCLK(clock5)/TDM1-L1RXCLK(clock5) |               |               |               | I             |               |               |               |               |             |                 |                     |                 |                          | I                        |
| PC28/TDM2-TXCLK(clock4)                     |               |               |               |               |               |               |               | I             |             |                 |                     |                 |                          |                          |
| PC29/TDM2-RXCLK(clock3)                     |               |               |               |               |               |               |               | I             |             |                 |                     |                 |                          |                          |
| PC30/TDMA1-TXCLK(clock2)                    | I             |               |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |
| PC31/DS3-RXCLK(clock1)/TDMA1-RXCLK(clock1)  | I             |               |               |               |               |               |               |               |             |                 |                     |                 | I                        |                          |
| PD10/TDM1-L1RSYNC                           |               | I             |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |
| PD11/TDM1-L1TSYNC                           |               | I             |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |
| PD12/TDM1-L1RXD                             |               | I             |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |
| PD13/TDM1-L1TXD                             |               | O             |               |               |               |               |               |               |             |                 |                     |                 |                          |                          |

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## 2•1•1 Module Selection.

### 2•1•1•1 Fast Ethernet selection

As mentioned above, the FE is enabled/disabled by S/W using PC9, PC10 as MII: MDIO and MDC pins. The FE control is done via the MII internal registers.

FE\_1 address = 00001h

FE\_2 address = 00010h.

FE\_0 address = 00000h (ADS).

### 2•1•1•2 8 x T1/E1

Each one of the 8 x T1/E1 is enabled by the following ports:

PD4 - T1\_1  
 PD5 - T1\_2  
 PD6 - T1\_3  
 PD7 - T1\_4  
 PD8 - T1\_5  
 PD9 - T1\_6  
 PD18 - T1\_7  
 PD19 - T1\_8

### 2•1•1•3 2 x DS3

Each one of the 2 x DS3 is enabled/disabled by the following ports:

PD25 - DS3\_1 (DS3\_1 is enabled only if T1\_1 & T1\_7 & T1\_8 is disabled and PD25 is low).

PA4 - DS3\_2 (DS3\_2 is enabled only if T1\_3 & T1\_4 & T1\_5 & T1\_8 is disabled and PA4 is low).

## 2•2 INDICATORS

The MPC8260TCOM has the following indicators.

### 2•2•1 Fast Ethernet 1 TXD. LD1

LD1 is light whenever the MPC8260 transmits data to FE\_1 (LXT970 - U1).

### 2•2•2 Fast Ethernet 1 RXD. LD2

LD2 is light whenever the MPC8260 receives data from FE\_1 (LXT970 - U1).

### 2•2•3 Fast Ethernet 2 TXD. LD3

LD3 is light whenever the MPC8260 transmits data to FE\_2 (LXT970 - U2).

### 2•2•4 Fast Ethernet 2 RXD. LD4

LD4 is light whenever the MPC8260 receives data from FE\_2 (LXT970 - U2).

### 2•2•5 Fast Ethernet 1 SPEED. LD5

LD5 is light whenever FE\_1 (LXT970 - U1) is configured to Fast Ethernet.

### **2•2•6 Fast Ethernet 1 LINK/LOCK. LD6**

LD6 indicates in 100Mbps a scrambler lock and receipt of valid idle code.  
LD6 indicates in 10Mbps a Link Valid status.

### **2•2•7 Fast Ethernet 1 Collision. LD7**

LD7 indicates in default mode a collision.  
LXT970 can be programmed for other indications. For detailed description see the LXT970 user's manual.

### **2•2•8 Fast Ethernet 2 SPEED. LD8**

LD8 is light whenever the FE\_2 (LXT970 - U1) is configured to Fast Ethernet.

### **2•2•9 Fast Ethernet 2 LINK/LOCK. LD9**

LD9 indicates in 100Mbps a scrambler lock and receipt of valid idle code. (LXT970 - U2)  
LD9 indicates in 10Mbps a Link Valid status.

### **2•2•10 Fast Ethernet 2 Collision. LD10**

LD10 indicates in default mode a collision.  
LXT970 can be programmed for other indications.

### **2•2•11 DS3 2 FRAME ERROR. LD11**

LD11 is light whenever an error on the F-bit or M-bit is occurred.

### **2•2•12 DS3 2 RXLOS. LD12**

LD12 is light whenever  $175 \pm 75$  consecutive zeros appear in incoming data stream.

### **2•2•13 DS3 2 ENABLE. LD13**

LD13 is light whenever DS3 2 is enabled.

### **2•2•14 DS3 1 FRAME ERROR. LD14**

LD14 is light whenever an error on the F-bit or M-bit is occurred.

### **2•2•15 DS3 1 RXLOS LD15**

LD15 is light whenever  $175 \pm 75$  consecutive zeros appear in incoming data stream.

### **2•2•16 DS3 1 ENABLE. LD16**

LD16 is light whenever DS3 2 is enabled.

### **2•2•17 T1/E1 8 ENABLE. LD17**

LD17 is light whenever T1/E1\_8 is enabled.

### **2•2•18 T1/E1 7 ENABLE. LD18**

LD18 is light whenever T1/E1\_7 is enabled.

### **2•2•19 T1/E1 6 ENABLE. LD19**

LD19 is light whenever T1/E1\_6 is enabled.

### **2•2•20 T1/E1 5 ENABLE. LD20**

LD20 is light whenever T1/E1\_5 is enabled.

**2•2•21 T1/E1 4 ENABLE. LD21**

LD21 is light whenever T1/E1\_4 is enabled.

**2•2•22 T1/E1 3 ENABLE. LD22**

LD22 is light whenever T1/E1\_3 is enabled.

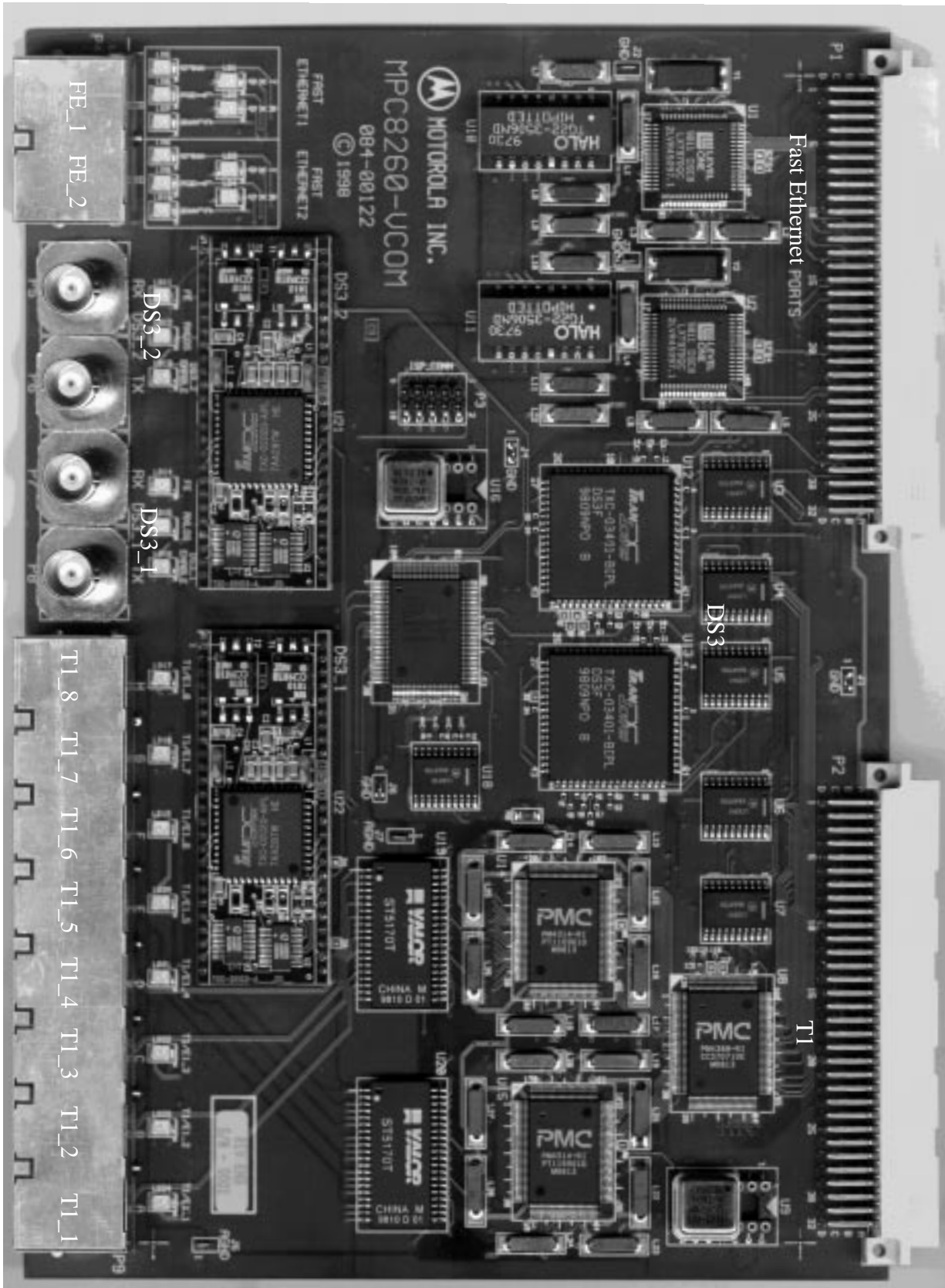
**2•2•23 T1/E1 2 ENABLE. LD23**

LD23 is light whenever T1/E1\_2 is enabled.

**2•2•24 T1/E1 1 ENABLE. LD24**

LD24 is light whenever T1/E1\_1 is enabled.

**FIGURE 1-2 MPC8260TCOM Board**



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## CHAPTER 3 - FUNCTIONAL DESCRIPTION

### 3•1 INTRODUCTION

This chapter details the hardware design of the MPC8260TCOM, and describes each module.

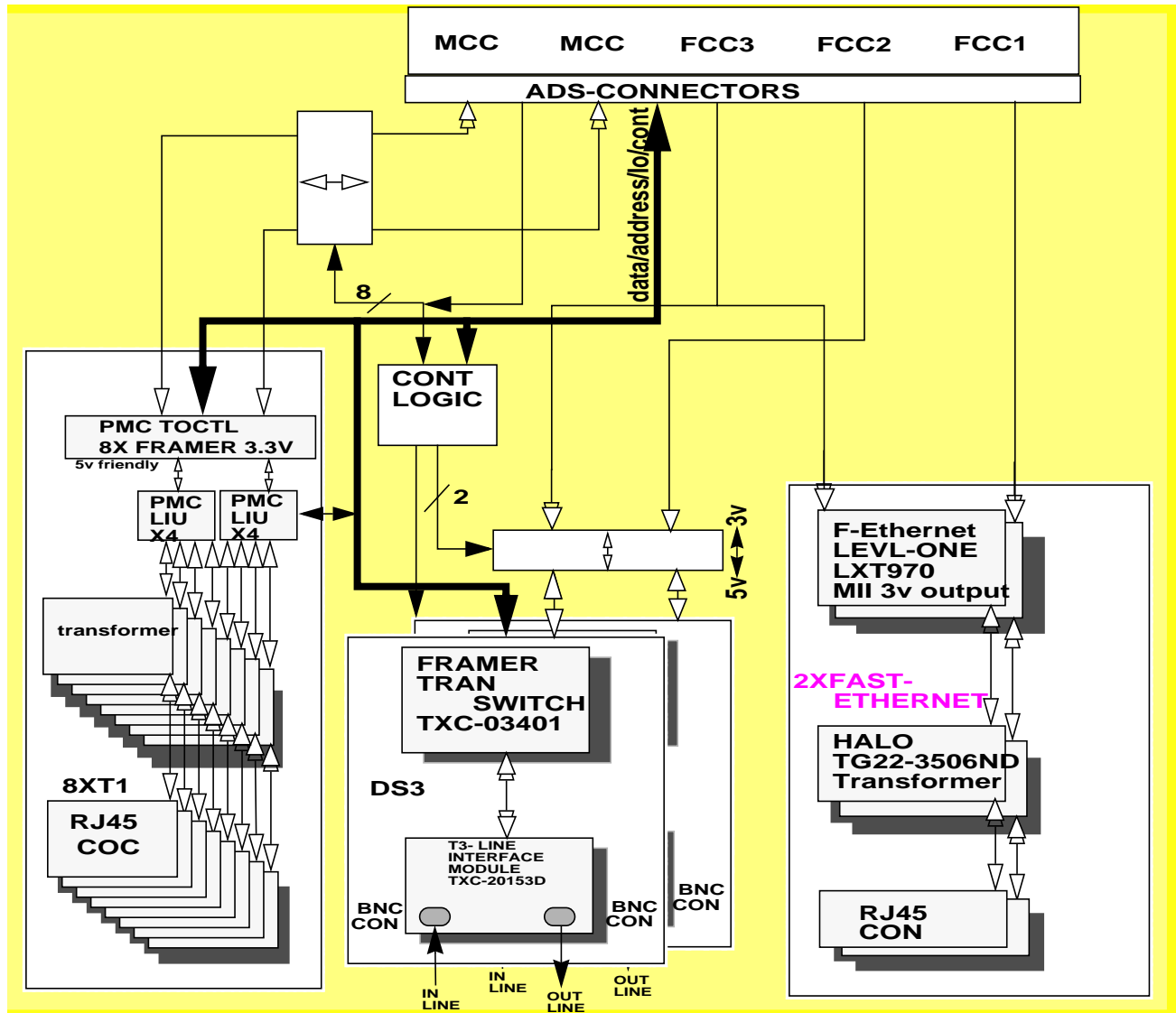
### 3•2 GENERAL DESCRIPTION

The MPC8260TCOM includes four parts.

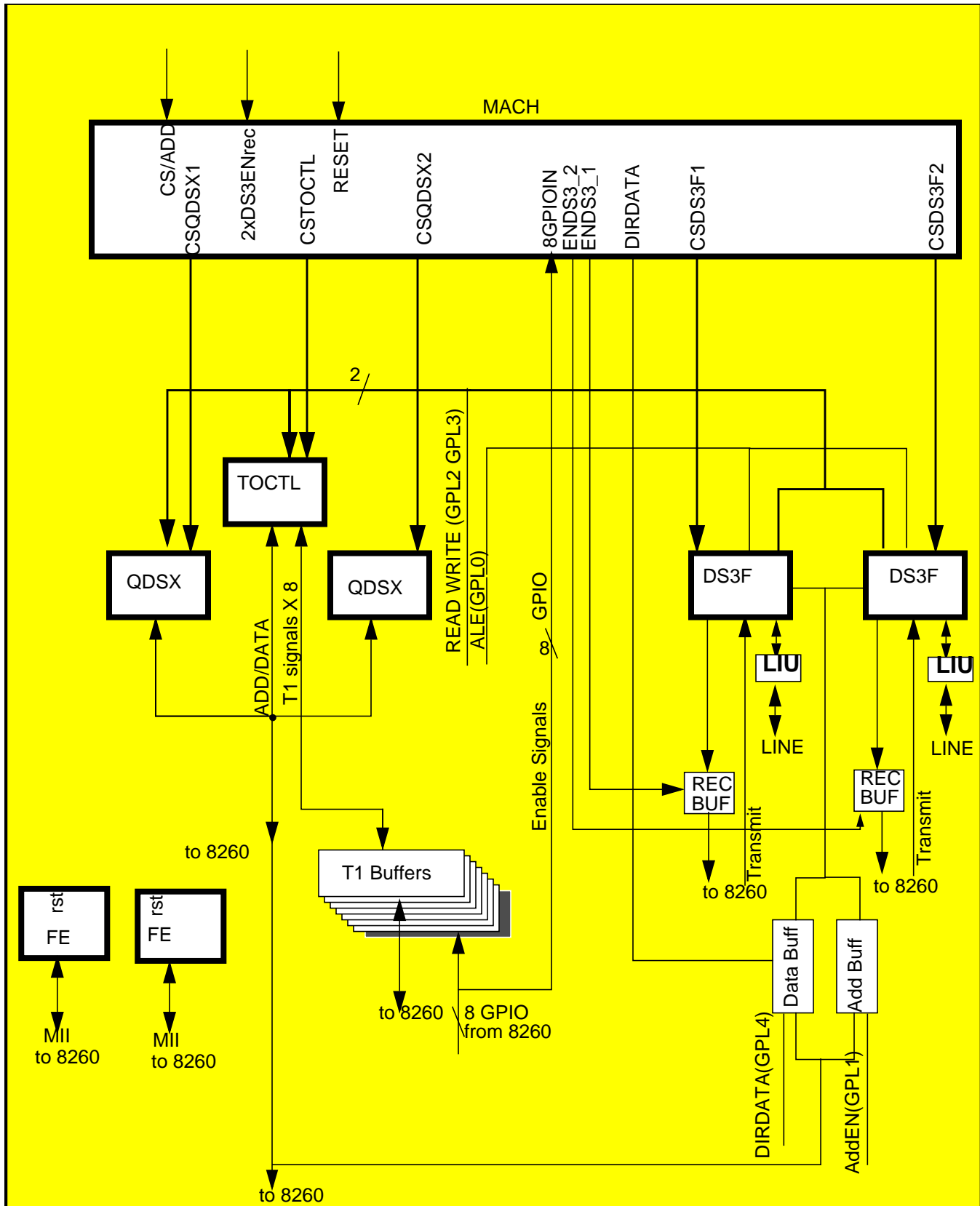
- 1. M8260ADS include the MPC8260 device on board.
- 2. Fast Ethernet include the LXT970 devices.
- 3. DS3 include the TXC-03401 framer and 20153G line interface module.
- 4. T1 include the TOCTL framer PM4388 and PM4314 line interface.

The following paragraphs will show the TCOM block diagram and describe each one of the board parts.

**FIGURE 4-1 8260TCOM BLOCK DIAGRAM**



**3-3 CONTROL LOGIC BLOCK**



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### 3•4 MPC8260ADS

The MPC8260ADS is meant to serve as a platform for S/W and H/W development around the MPC8260. Using its on board resources and its associated debugger, a developer is able to load his code, run it, set breakpoints, display memory and registers and connect his own proprietary H/W via the CPM expansion connectors (P1 and P2 on the MPC8260TCOM), to be incorporated to a desired system with the MPC8260 device.

### 3•5 Ethernet. - 100BASE-TX and 10BASE-T

Two Fast-Ethernet modules used FCC1 (FE\_1) and FCC3 (FE\_2) are on this board, together with the Fast Ethernet on the ADS board it will be possible to run 3 Fast Ethernet modules at the same time or it is possible to disable each one of them to let the user to use the FCC's for other uses. The disable can be done by the MDIO bus. The device that use to perform the transceiver operation is the Level One LXT970. The LXT970 is an IEEE 802.3 compliant 10/100Mbps Fast Ethernet PHY Transceiver that directly supports both 100BASE-TX and 10BASE-T applications. Provides a Media Independent Interface (MII) for easy attachment to 10/100 Media Access Controller (MAC)s. The LXT970 supports full-duplex operation at 10 and 100 Mbps. Its operating condition can be set using autonegotiation panel detection or manual control. The configuration of the LXT970 can be controlled via the MII serial port (MDIO Interface). This interface allows upper-layer devices to control or monitor the LXT970. The LXT970 can also be controlled via external pin settings (Hardware Control Interface). This option is not supported on the 8260TCOM.

The LXT970 is connected to the MPC8260 via the FCC1 and FCC3 that performs MII interface through the I/O ports.

### 3•6 DS3 (T3).

Two DS3 modules are on this board; they use the TDMA1 (FCC2) and TDMA2 (FCC3). Each one of the DS3 module is composed of Framer and Line Interface Unit. The DS3 Framer is TRAN-SWITCH TXC-03401. It is a 5V device. The MPC8260 device is a 3.3V device. That is why a 5V to 3.3V translator is needed in the output direction from the framer, to bridge between the DS3F, (5V) to the MPC8260 (3.3V) The device used is a 74LXT541.

The DS3F is designed for DS3 framer applications in which broadband payloads are mapped into the 44.736 Mbit/s DS3 frame format. The payload interface is nibble-parallel format.

The Line Interface Unit is a TRAN-SWITCH TXC-20153G, this LIU is a module which include the transformer and the TRAN SWITCH TXC-02020 LIU device. It connected from one side to the DS3F and from the other side to BNC connector. It is a 5V device.

Each one of the DS3 module can be isolated by a logic control to let the user to use FCC2 and FCC3 for other purposes.

The DS3 Line Interface Module (DS3LIM-SN) is a complete and compact full duplex analog line to digital terminal interface. It converts B3ZS - encoded line signals, in either DS3 asynchronous, to and from NRZ data and clock signals, in addition to the synchronous signal option.

In order to enable DS3\_1, PD4 (T1\_1) & PD18 (T1\_7) & PD19 (T1\_8) should be high '-1' and then drive PD25 to be low '-0'. In order to enable DS3\_2, PD6 (T1\_3) & PD7 (T1\_4) & PD8 (T1\_5) & PD19 (T1\_8) should be high '-1' and then drive PA4 to be low '-0'. Each one of the DS3 module has a led to light when this DS3 module is enable, LD13 for DS3\_2 and LD16 for DS3\_1. Each DS3 modules also has a Frame Error and Receive signal loss leds.

Each one of the DS3 module have two loopback capabilities for testing transmit and receive loopback via the loopback controls block of the TXC-20153G.

Transmit - to - Receive loopback connects the data path from the transmit I/O control block output to the receive I/O control block input, and disable the external receiver input.

Transmit - to - Receive loopback is activated by placing a low on the  $\overline{TR}$  signal pin.

Receive - to Transmit loopback connects the receive data output path to the transmit input circuits and disable the NRZ transmit input.

Receive - to - transmit loopback activated by placing a low on  $\overline{RT}$  pin.

For more information see the TXC-20153G and TXC-02020 user manual.

The physical control to the  $\overline{RT}$ ,  $\overline{TR}$  signals of both DS3 modules are controlled as follow:

DS3\_1 RT will be low if PA5 and PA1 will be low. (if PA1 is high there is no loop back at all)

DS3\_1 TR will be low if PA5 will be high and PA1 will be low. (if PA1 is high there is no loop back at all)

DS3\_2 RT will be low if PC13 and PA1 will be low. (if PA1 is high there is no loop back at all)

DS3\_2 TR will be low if PC13 will be high and PA1 will be low. (if PA1 is high there is no loop back at all)

### 3•7 T1

The T1 is a 1.544Mhz serial line; this board can handle up to 8 T1 line simultaneously. All the T1 modules on this board are composed by one PM4388 (Framer), 2 PM4314 (LIU) and 2 ST5170 transformers. The PM4388 device includes 8 T1 framers, each framer in this device can be controlled by its own internal registers. The PM4388 controlled by the MPC8260 data and address bus. It gets its chip select signal from the control logic. The PM4314, which is a quad line interface unit, is connected from one side to the framer, PM4388, and from the other side to the line transformer. Each one of the T1 line interface units can be also controlled by the internal registers. This device is also connected to the MPC8260 by the address and data bus. It gets its chip select signal from the control logic. The ST5170 includes a 4 transformers, each one of the ST5170 connected to one PM4314 device.

Each one of the MPC8260 T1 group of signals can be isolate from the framer by buffer. (The PM4388 device can not isolate independently one of the eight T1 signal group). T1\_1,2,3,4 modules can be isolated by PD4-PD7. '0' on these signals enables each T1 interface. The T1-5,6,7,8 modules can be isolated by PD8, PD9, PD18 and PD19. '0' on these signals enables each T1 interface. 8 leds are placed on the board to show which one of the T1 port is enable. Each led lights depend upon the enable T1 signal, for example if PD4 will be low LD24 (T1\_1 enable) will light.

Together with the 8260ADS board it will be possible to operate the 8 x T1 and ATM 155Mbps or Fast Ethernet over FCC1.

### 3•8 Control Logic.

The control logic allows the user to disable each one of the following elements: 8 x T1, 2 x DS3 and 4 x DS3 loopback options. Although each one of the T1 is enabled directly from the MPC8260, all the T1 enable signals insert to the logic control, in order to disable a DS3 module that share some signal(s) as T1\_x. If one of the T1 enable and it share the same signals as one of the DS3, the appropriate DS3 will be disable.

Each one of the Fast-Ethernet modules connected to FCC1, FCC2 and FCC3 (on the 8260TCOM or on the 8260ADS) is controlled via the MDIO and MDC signals (PC10, PC9); the SW should be aware that enabling the Fast Ethernet without disabling the corresponding element that share the same GPIO signals will damage the board. FE1 share the signals as the ATM module on the ADS, FE0 (the one that is placed on the 8260ADS) share some of the T1\_8, T1\_7, T1\_6 and T1\_5. FE2 share some of the signals of T1\_6, T1\_5, T1\_4 T1\_3

In order to use DS3 the SW should drive PD25 for DS3\_1 (FCC2) to low or PA4 for DS3\_2 (FCC3) to low. If no one of the T1 that share the same signal of the desire DS3 is enable, the DS3(x) will be enable. The user should disable the appropriate T1 channel if the appropriate T1 channel will not be disable the DS3 will not be enable. DS3(1) share the same signals with T1\_1, T1\_7 and T1\_8, DS3(2) share the same signals with T1\_8, T1\_5, T1\_4, T1\_3.

In addition to the above GPIO control signal from the MPC8260 the 8260TCOM Board use PA1, PA5 and PC13 to select 4 types of DS3 loop-back as describe in the DS3 description paragraph.

The logic control select each one of the following devices by asserting its Chip Select signal, The ADS drive two CS signals to the TCOM CS6 and CS7 called CSBRD1 and CSBRD2.



**The base address for the T1 devices is 60,000,000H.**

The devices that need a CS are:

PM4388 TOCTL use !A20 & !A19 & !A18 & !BRDCS1 (CS6), T1\_1 - T1\_8 FRAMER

PM4314 QDSX use !A20 & !A19 & A18 & !BRDCS1 (CS6), T1\_1 - T1\_4 LIU

PM4314 QDSX use !A20 & A19 & !A18 & !BRDCS1 (CS6), T1\_5 - T1\_8 LIU

**The base address for the DS3 devices is 70,000,000H.**

TXC-03401 DS3F use !A20 & A19 & A18 & !BRDCS2 (CS7), DS3\_1

TXC-03401 DS3F use A20 & !A19 & !A18 & !BRDCS2 (CS7), DS3\_2

**NOTE:** Fast Ethernet modules on this board do not use any signal from the logic controls except for RESET signal to the FE transceiver.

**Table 3: Enable Selection**

| Voyager Port        | The Port control | T1 1 | T1 2 | T1 3 | T1 4 | T1 5 | T1 6 | T1 7 | T1 8 | DS3_1 enable signal | DS3_2 enable signal | DS3_1 LB RT1 | DS3_1 LB TR1 | DS3_2 LB RT2 | DS3_2 LB TR2 |
|---------------------|------------------|------|------|------|------|------|------|------|------|---------------------|---------------------|--------------|--------------|--------------|--------------|
| PD4 = 0             | T1_1             | EN   |      |      |      |      |      |      |      | DIS                 | X                   |              |              |              |              |
| PD5 = 0             | T1_2             |      | EN   |      |      |      |      |      |      | X                   | X                   |              |              |              |              |
| PD6 = 0             | T1_3             |      |      | EN   |      |      |      |      |      | X                   | DIS                 |              |              |              |              |
| PD7 = 0             | T1_4             |      |      |      | EN   |      |      |      |      | X                   | DIS                 |              |              |              |              |
| PD8 = 0             | T1_5             |      |      |      |      | EN   |      |      |      | X                   | DIS                 |              |              |              |              |
| PD9 = 0             | T1_6             |      |      |      |      |      | EN   |      |      | X                   | X                   |              |              |              |              |
| PD18 = 0            | T1_7             |      |      |      |      |      |      | EN   |      | DIS                 | X                   |              |              |              |              |
| PD19 = 0            | T1_8             |      |      |      |      |      |      |      | EN   | DIS                 | DIS                 |              |              |              |              |
| PD25 = 0            | DS3_1            | DIS  |      |      |      |      |      |      | DIS  | DIS                 | EN                  |              |              |              |              |
| PA4 = 0             | DS3_2            |      |      | DIS  | DIS  | DIS  |      |      | DIS  |                     | EN                  |              |              |              |              |
| PA5 = 0<br>PA1 = 0  |                  |      |      |      |      |      |      |      |      |                     |                     | EN           |              |              |              |
| PA5 = 1<br>PA1 = 0  |                  |      |      |      |      |      |      |      |      |                     |                     |              | EN           |              |              |
| PC13 = 0<br>PA1 = 0 |                  |      |      |      |      |      |      |      |      |                     |                     |              |              | EN           |              |
| PC13 = 1<br>PA1 = 0 |                  |      |      |      |      |      |      |      |      |                     |                     |              |              |              | EN           |

**3•9 8260ADS to 8260TCOM Connectors**

The physical connection from the MPC8260ADS to the MPC860TCOM board is done by the two 128 pin connectors. One connector contains 16 Address lines, 16 Data lines, CS6 and CS7 signals, WE0, WE1, ALE, BCTL0, GPL0 - GPL5, RESET, IRQ and CLOCK. Other signals are for showing the connected board status and rev. The status shown is one of 4 DS3 loopback option, DS3\_1 and DS3\_2 enable. The other

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connector contains all MPC8260 parallel ports. These connectors also include the power signals for the 8260TCOM board (ground, 3.3V and 5V).

### 3•10 Ports Selection

The following table shows all the ports that are used on the 8260TCOM. It includes there function for each used module. The table includes:

1. The port column, i.e. the port number.
2. The module name function which contains the 8 T1 ports (8 column).
3. The ATM 8 bit port on the ADS (this column is a dark column to accent the ADS function which uses FCC1); each named cell of the column describes the function.
4. The Fast Ethernet address '1' column use FCC1.
5. The Fast Ethernet address '0' column which is also a dark one since it is on the ADS; it use FCC2.
6. The Fast ethernet address '2' column use FCC3.
7. The DS3\_1 column use FCC2.
8. The DS3\_2 column use FCC3.

In each table row there are I or O signs at the right side of the function name meaning that this signal is an output from the MPC8260 device (O) or an input to the MPC8260 (I). In some rows there are several I/O signs which mean the respective port can be use for several function. The user should avoid conflicts; as an example if the ATM is used on the ADS it is not possible to use the FE address 1. This table can help the user to define the desire module without having a conflict, or if there is a problem in the definition the user can know which one of the module can cause the problem.

PC9 and PC10 are the MII MDIO and MDC signals; these signals are common to the 3 FE modules - the one on the ADS and the two on the TCOM.

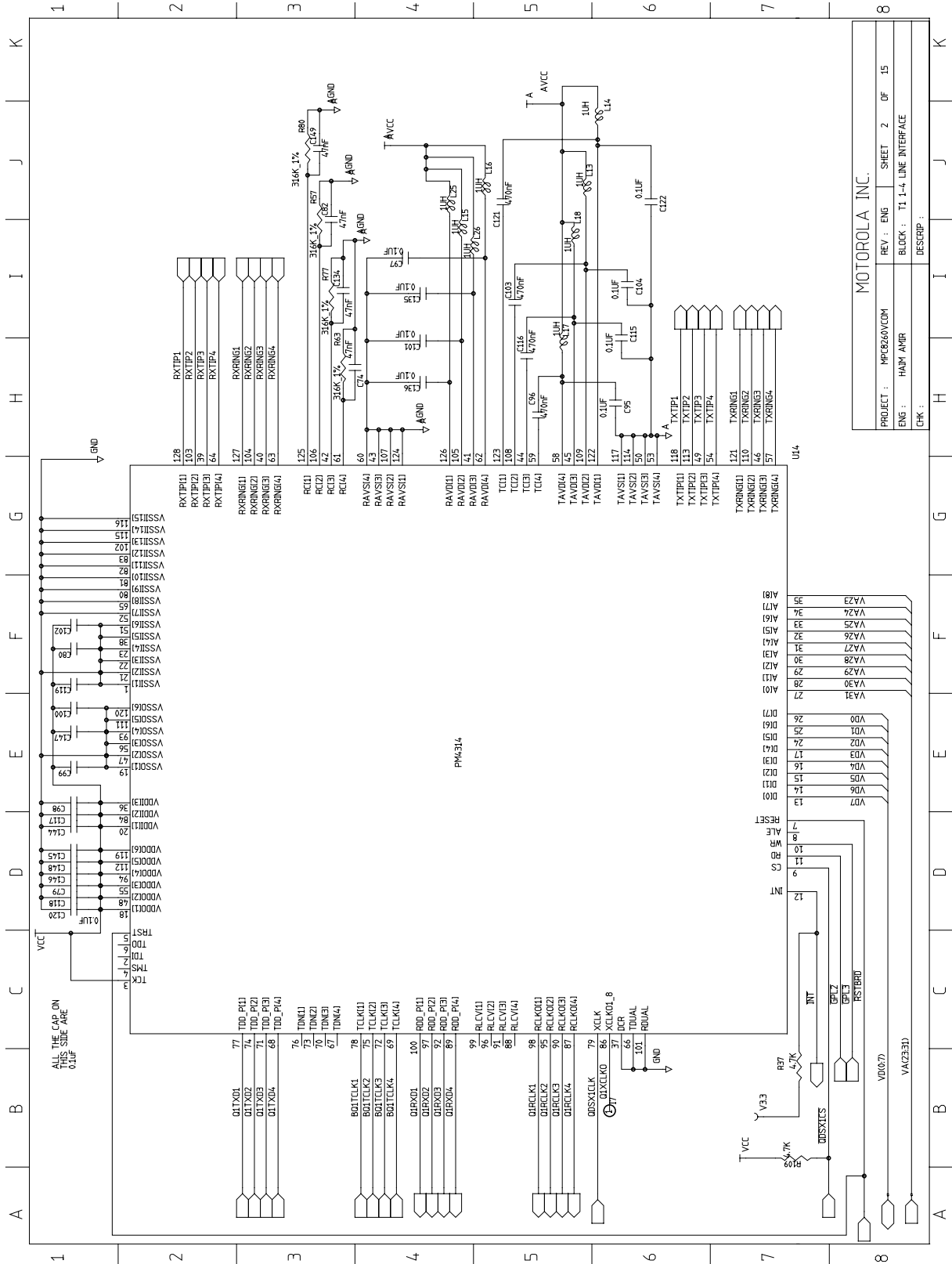
**Table 4: Ports Function Signals**

| Ports         | T1<br>1<br>A1 | T1<br>2<br>B1 | T1<br>3<br>C1 | T1<br>4<br>D1 | T1<br>5<br>A2 | T1<br>6<br>B2 | T1<br>7<br>C2 | T1<br>8<br>D2 | ADS ATM8 | FE<br>1<br>FCC1 | ADS FE 0<br>FCC2 | FE<br>2<br>FCC3 | TDM1<br>DS3<br>1<br>FCC2 | TDM2<br>DS3<br>2<br>FCC3 |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|-----------------|------------------|-----------------|--------------------------|--------------------------|
| PA2 (clock20) |               |               |               |               |               |               |               | TXCLK I       |          |                 |                  |                 | TXCLK I                  |                          |
| PA6           | RSYNC I       |               |               |               |               |               |               |               |          |                 |                  |                 | RSYNC I                  |                          |
| PA7           | TSYNC I       |               |               |               |               |               |               |               |          |                 |                  |                 | TSYNC I                  |                          |
| PA8           | RXD I         |               |               |               |               |               |               |               |          |                 |                  |                 | RXD0 I                   |                          |
| PA9           | TXD O         |               |               |               |               |               |               |               |          |                 |                  |                 | TXD0 O                   |                          |
| PA14          |               |               |               |               |               |               |               |               | RXD4 I   | RXD3 I          |                  |                 |                          |                          |
| PA15          |               |               |               |               |               |               |               |               | RXD5 I   | RXD2 I          |                  |                 |                          |                          |
| PA16          |               |               |               |               |               |               |               |               | RXD6 I   | RXD1 I          |                  |                 |                          |                          |
| PA17          |               |               |               |               |               |               |               |               | RXD7 I   | RXD0 I          |                  |                 |                          |                          |
| PA18          |               |               |               |               |               |               |               |               | TXD7 O   | TXD0 O          |                  |                 |                          |                          |
| PA19          |               |               |               |               |               |               |               |               | TXD6 O   | TXD1 O          |                  |                 |                          |                          |
| PA20          |               |               |               |               |               |               |               |               | TXD5 O   | TXD2 O          |                  |                 |                          |                          |
| PA21          |               |               |               |               |               |               |               |               | TXD4 O   | TXD3 O          |                  |                 |                          |                          |
| PA26          |               |               |               |               |               |               |               |               | RxClav I | RXER I          |                  |                 |                          |                          |
| PA27          |               |               |               |               |               |               |               |               | RxSoc I  | RXDV I          |                  |                 |                          |                          |
| PA28          |               |               |               |               |               |               |               |               | RxEnb O  | TXEN O          |                  |                 |                          |                          |
| PA29          |               |               |               |               |               |               |               |               | TxSoc O  | TXER O          |                  |                 |                          |                          |
| PA3(clock19)  |               |               |               |               |               |               |               | RXCLK I       |          |                 |                  |                 |                          | RXD1 I                   |
| PA30          |               |               |               |               |               |               |               |               | TxClav I | CRS I           |                  |                 |                          |                          |
| PA31          |               |               |               |               |               |               |               |               | TxEnb O  | COL I           |                  |                 |                          |                          |
| PB4           |               |               |               |               | RSYNC I       |               |               |               |          |                 |                  |                 | TXD3 O                   | RSYNC I                  |
| PB5           |               |               |               |               | TSYNC I       |               |               |               |          |                 |                  |                 | TXD2 O                   | TSYNC I                  |
| PB6           |               |               |               |               | RXD I         |               |               |               |          |                 |                  |                 | TXD1 O                   | RXD0 I                   |
| PB7           |               |               |               |               | TXD I         |               |               |               |          |                 |                  |                 | TXD0 O                   | TXD0 I                   |
| PB8           |               |               |               | RSYNC I       |               |               |               |               |          |                 |                  |                 | RXD0 I                   |                          |

**Table 4: Ports Function Signals**

| Ports          | T1<br>1<br>A1 | T1<br>2<br>B1 | T1<br>3<br>C1 | T1<br>4<br>D1 | T1<br>5<br>A2 | T1<br>6<br>B2 | T1<br>7<br>C2 | T1<br>8<br>D2 | ADS ATM8 | FE<br>1<br>FCC1 | ADS FE 0<br>FCC2 | FE<br>2<br>FCC3 | TDM1<br>DS3<br>1<br>FCC2 | TDM2<br>DS3<br>2<br>FCC3 |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|-----------------|------------------|-----------------|--------------------------|--------------------------|
| PB9            |               |               |               | TSYNC I       |               |               |               |               |          |                 |                  |                 | RXD1 I                   | TXD2 O                   |
| PB10           |               |               |               | RXD I         |               |               |               |               |          |                 |                  |                 | RXD2 I                   |                          |
| PB11           |               |               |               | TXD O         |               |               |               |               |          |                 |                  |                 | RXD3 I                   |                          |
| PB12           |               |               | RSYNC I       |               |               |               |               |               |          |                 |                  |                 | CRS I                    |                          |
| PB13           |               |               | TSYNC I       |               |               |               |               |               |          |                 |                  |                 | COL I                    | TXD1 O                   |
| PB14           |               |               | RXD I         |               |               |               |               |               |          |                 |                  |                 | TXEN O                   |                          |
| PB15           |               |               | TXD O         |               |               |               |               |               |          |                 |                  |                 | TXER O                   |                          |
| PB16           |               |               |               |               |               |               |               |               |          |                 |                  |                 | RXER I                   |                          |
| PB17           |               |               |               |               |               |               |               |               |          |                 |                  |                 | RXDV I                   |                          |
| PB18           |               |               |               |               |               |               |               |               |          |                 |                  | RXD3 I          |                          | RXD2 I                   |
| PB19           |               |               |               |               |               |               |               |               |          |                 |                  | RXD2 I          |                          | RXD3 I                   |
| PB20           |               |               |               |               |               |               |               | RSYNC I       |          |                 |                  | RXD1 I          | TXD1 O                   |                          |
| PB21           |               |               |               |               |               |               |               | TSYNC I       |          |                 |                  | RXD0 I          | TXD2 O                   |                          |
| PB22           |               |               |               |               |               |               |               | RXD I         |          |                 |                  | TXD0 O          | RXD1 I                   |                          |
| PB23           |               |               |               |               |               |               |               | TXD O         |          |                 |                  | TXD1 O          | RXD2 I                   |                          |
| PB24           |               |               |               |               |               |               |               | RSYNC I       |          |                 |                  | TXD2 O          | RXD3 I                   |                          |
| PB25           |               |               |               |               |               |               |               | TSYNC I       |          |                 |                  | TXD3 O          | TXD3 O                   |                          |
| PB26           |               |               |               |               |               |               |               | RXD I         |          |                 |                  | CRS I           |                          |                          |
| PB27           |               |               |               |               |               |               |               | TXD O         |          |                 |                  | COL I           |                          |                          |
| PB28           |               |               |               |               |               | TSYNC I       |               |               |          |                 |                  | RXER I          |                          |                          |
| PB29           |               |               |               |               |               | RSYNC I       |               |               |          |                 |                  | TXEN O          |                          |                          |
| PB30           |               |               |               |               |               | RXD I         |               |               |          |                 |                  | RXDV I          |                          |                          |
| PB31           |               |               |               |               |               | TXD O         |               |               |          |                 |                  | TXER O          |                          |                          |
| PC9/           |               |               |               |               |               |               |               |               |          |                 | MDIO B           | MDIO B          | MDIO B                   |                          |
| PC10/          |               |               |               |               |               |               |               |               |          |                 | MDC O            | MDC O           | MDC O                    |                          |
| PC1            |               |               |               |               |               |               |               |               |          |                 |                  |                 |                          | TXD3 O                   |
| PC16 (clock16) |               |               |               |               |               | TCLK I        |               |               |          |                 |                  |                 | TCLK I                   |                          |
| PC17 (clock15) |               |               |               |               |               | RCLK I        |               |               |          |                 |                  |                 | RCLK I                   |                          |
| PC18 (clock14) |               |               |               |               |               | TCLK I        |               |               |          |                 |                  | TCLK I          |                          |                          |
| PC19 (clock13) |               |               |               |               |               | RCLK I        |               |               |          |                 |                  | RCLK I          |                          |                          |
| PC20 (clock12) |               |               |               |               |               |               |               |               | TxClk I  | TCLK I          |                  |                 |                          |                          |
| PC21 (clock11) |               |               |               |               |               |               |               |               | RxClk I  | RCLK I          |                  |                 |                          |                          |
| PC22 (clock10) |               | TCLK I        |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |
| PC23 (clock9)  |               | RCLK I        |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |
| PC24 (clock8)  |               |               |               | TCLK I        |               |               |               |               |          |                 |                  |                 |                          |                          |
| PC25 (clock7)  |               |               |               | RCLK I        |               |               |               |               |          |                 |                  |                 |                          |                          |
| PC26 (clock6)  |               |               | TCLK I        |               |               |               |               |               |          |                 |                  |                 |                          | TCLK I                   |
| PC27 (clock5)  |               |               | RCLK I        |               |               |               |               |               |          |                 |                  |                 |                          | RCLK I                   |
| PC28 (clock4)  |               |               |               |               |               |               |               | TCLK I        |          |                 |                  |                 |                          |                          |
| PC29 (clock3)  |               |               |               |               |               |               |               | RCLK I        |          |                 |                  |                 |                          |                          |
| PC30 (clock2)  | TCLK I        |               |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |
| PC31 (clock1)  | RCLK I        |               |               |               |               |               |               |               |          |                 |                  |                 | RCLK I                   |                          |
| PD10           |               | RSYNC I       |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |
| PD11           |               | TSYNC I       |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |
| PD12           |               | RXD I         |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |
| PD13           |               | TXD O         |               |               |               |               |               |               |          |                 |                  |                 |                          |                          |

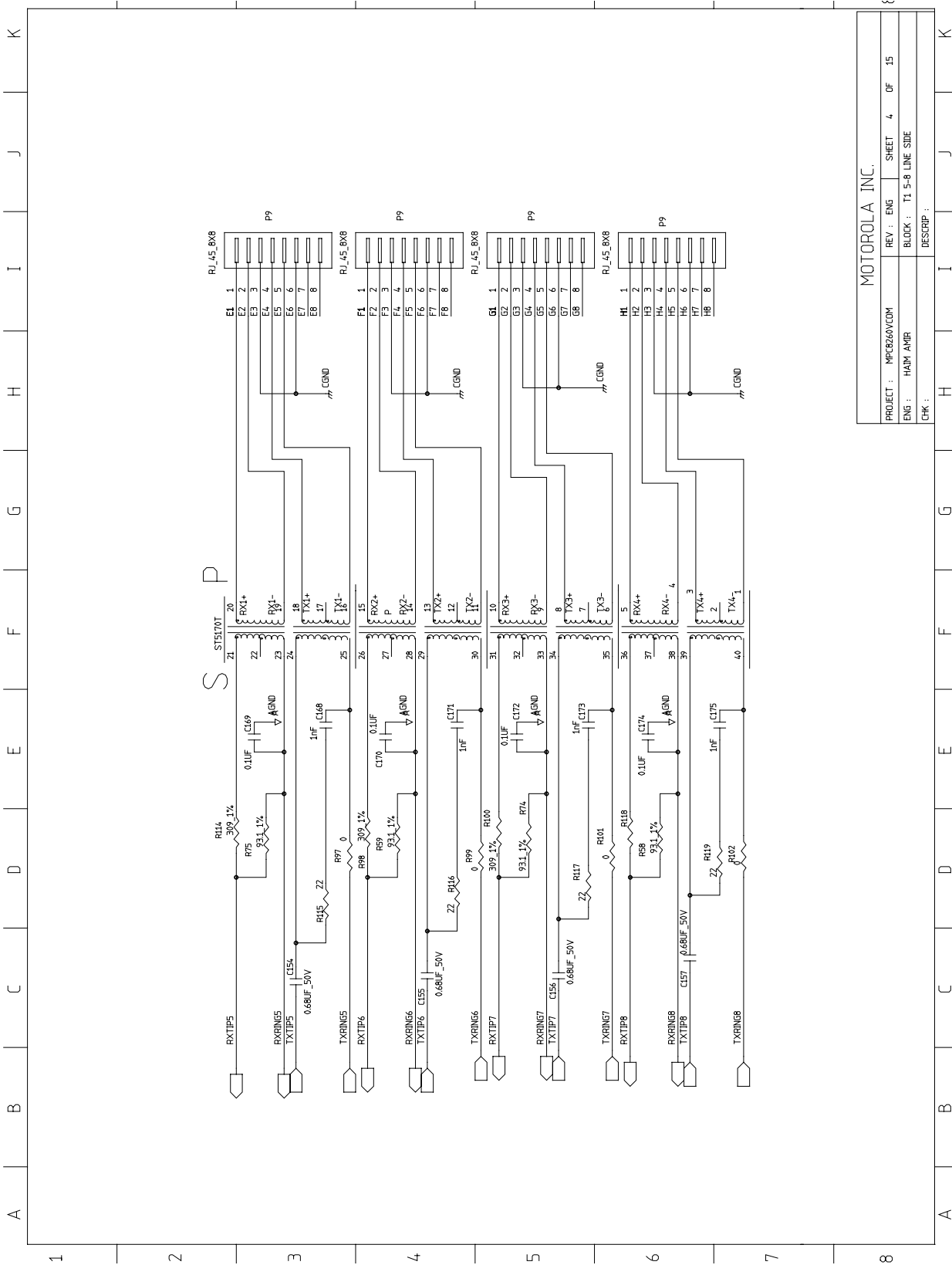




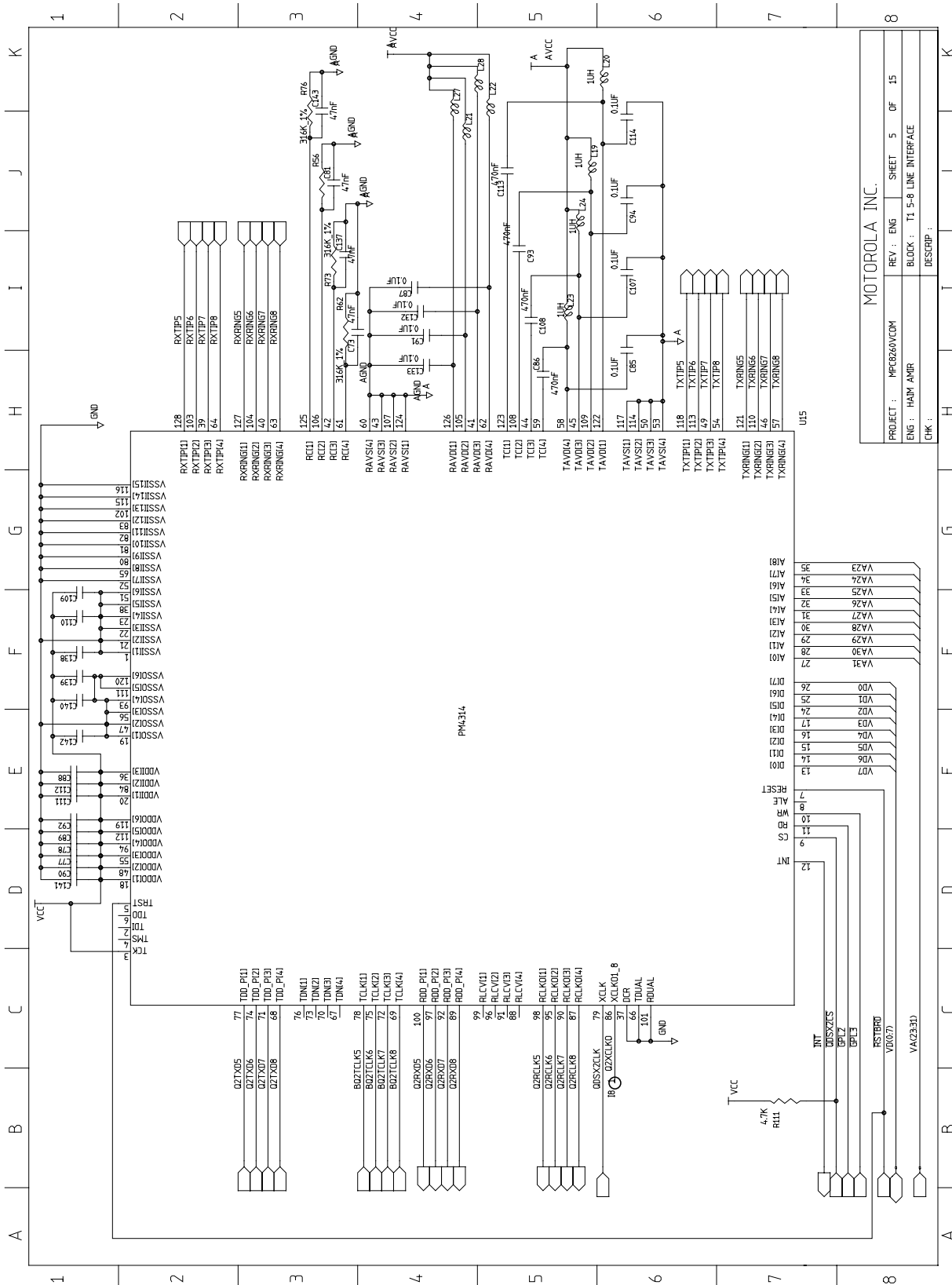
|           |             |           |                       |       |   |    |    |
|-----------|-------------|-----------|-----------------------|-------|---|----|----|
| PROJECT : | MPC8260TCOM | REV :     | ENG                   | SHEET | 2 | OF | 15 |
| ENG :     | HANW AMB    | BLOCK :   | T1 1-4 LINE INTERFACE |       |   |    |    |
| CHK :     |             | DESCRIP : |                       |       |   |    |    |

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|                       |                          |         |       |
|-----------------------|--------------------------|---------|-------|
| MOTOROLA INC.         |                          |         |       |
| PROJECT : MPC8260VCOM | REV : ENG                | SHEET 4 | OF 15 |
| ENG : HARM AMR        | BLOCK : T1 5-8 LINE SIDE |         |       |
| CHK :                 | DESCRIP :                |         |       |



|           |                       |
|-----------|-----------------------|
| PROJECT : | MPC8260VCOM           |
| REV :     | ENG                   |
| SHEET :   | 5 OF 15               |
| BLOCK :   | T1 5-8 LINE INTERFACE |
| CHK :     | DESCRIP :             |

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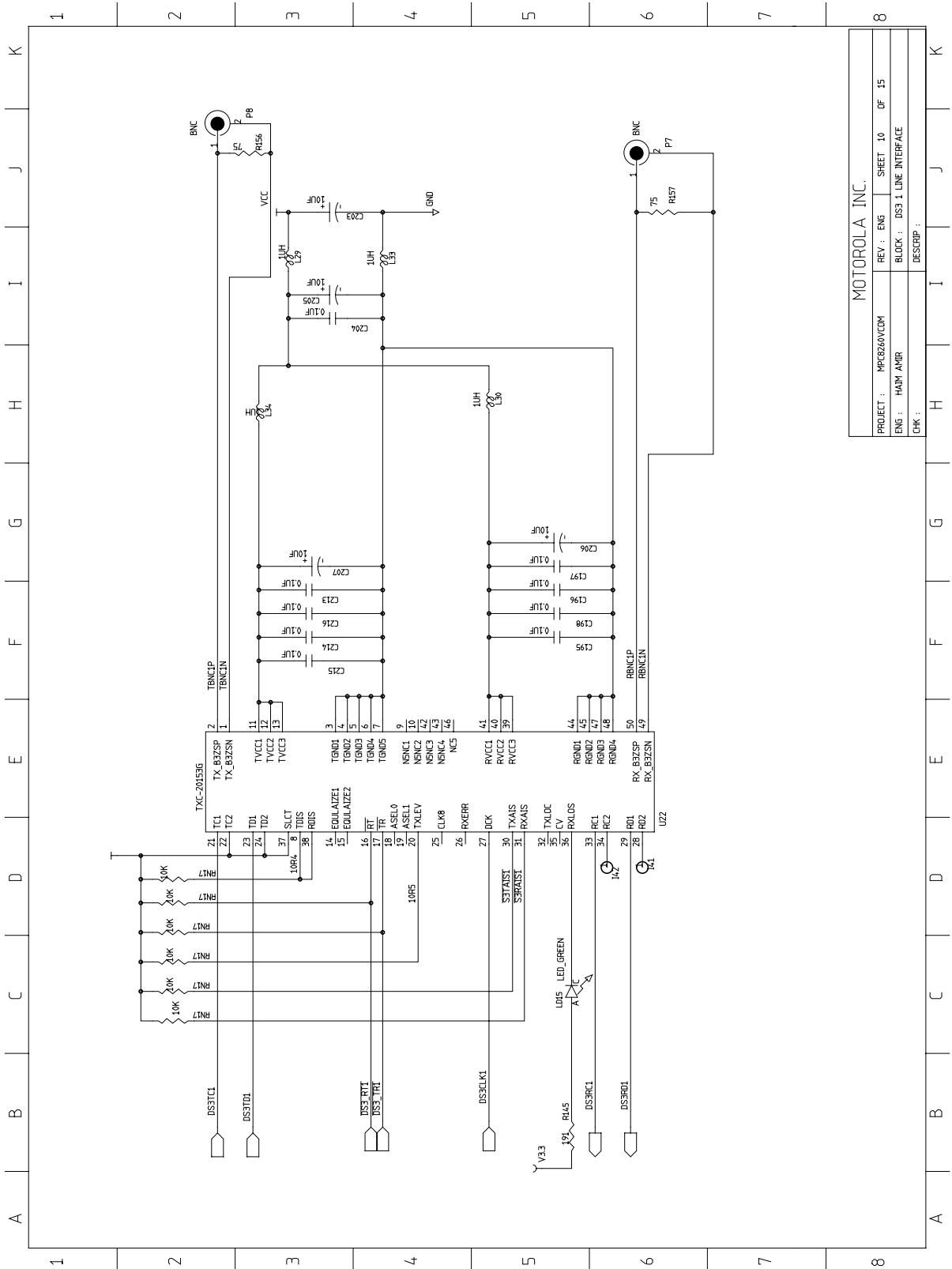






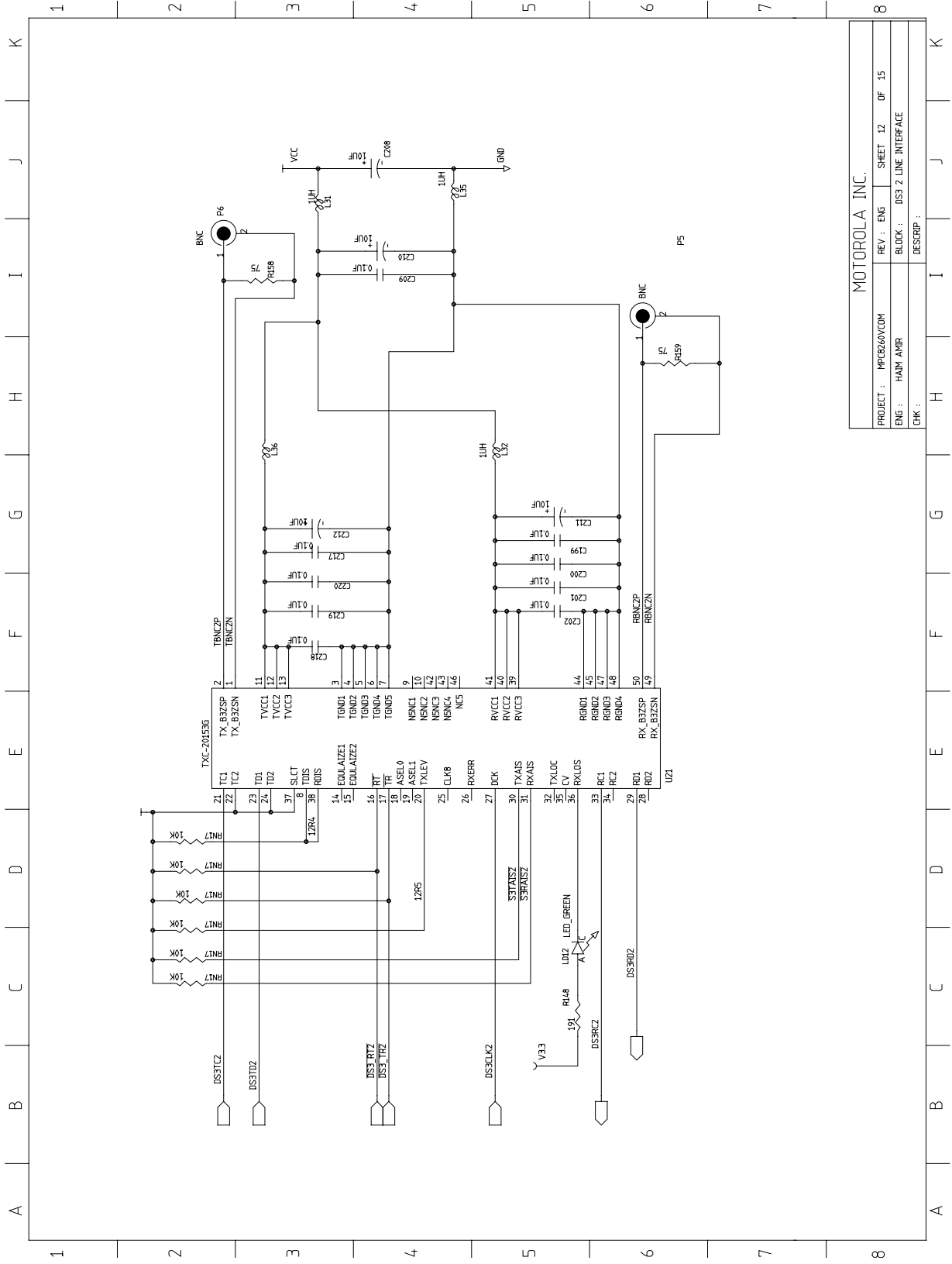




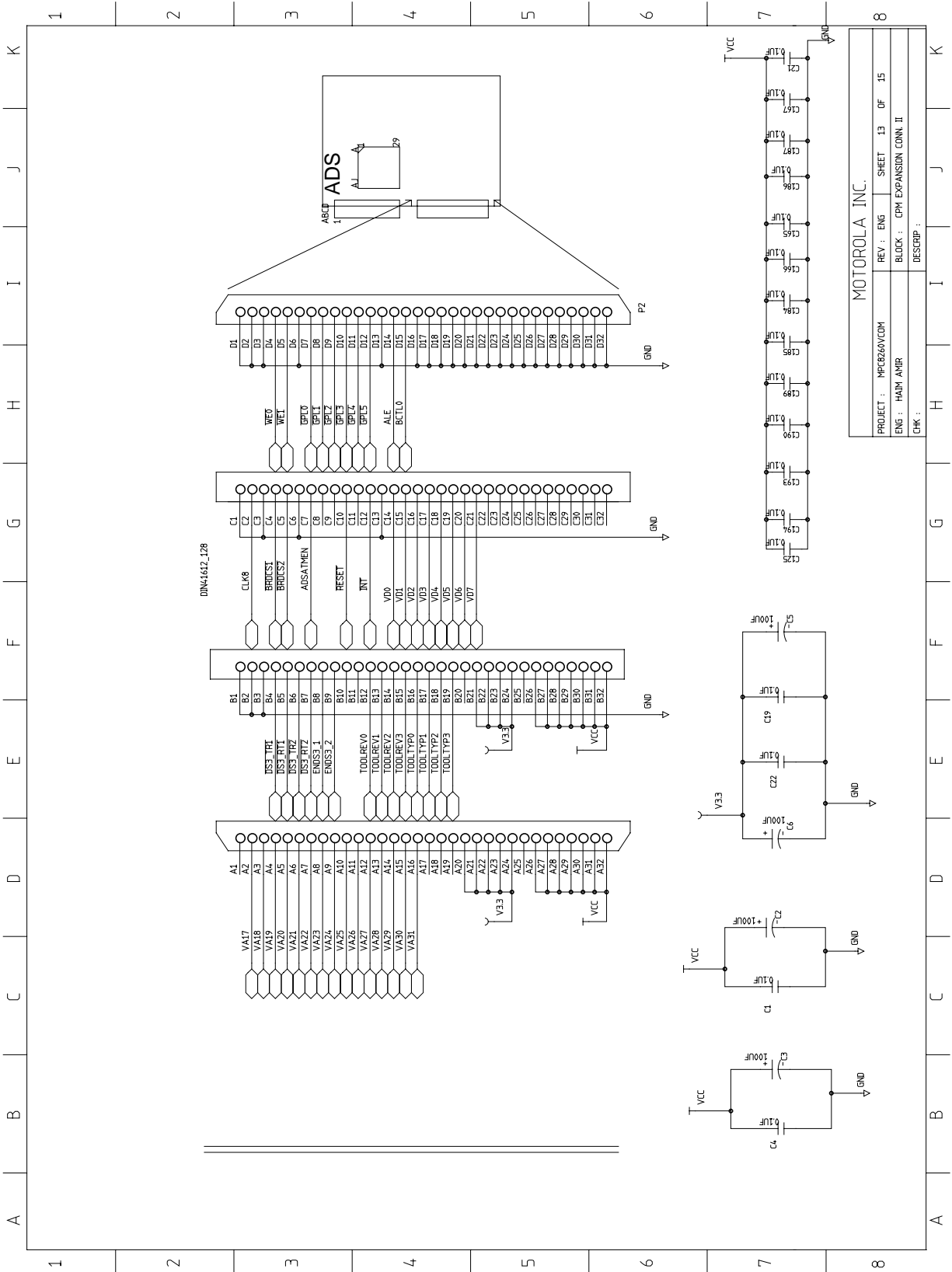


|               |             |           |                      |
|---------------|-------------|-----------|----------------------|
| MOTOROLA INC. |             |           |                      |
| PROJECT :     | MPC8260TCOM | REV :     | ENG                  |
| ENG :         | HAIM AMR    | SHEET :   | 10 OF 15             |
| CHK :         |             | BLOCK :   | DS3 1 LINE INTERFACE |
|               |             | DESCRIP : |                      |

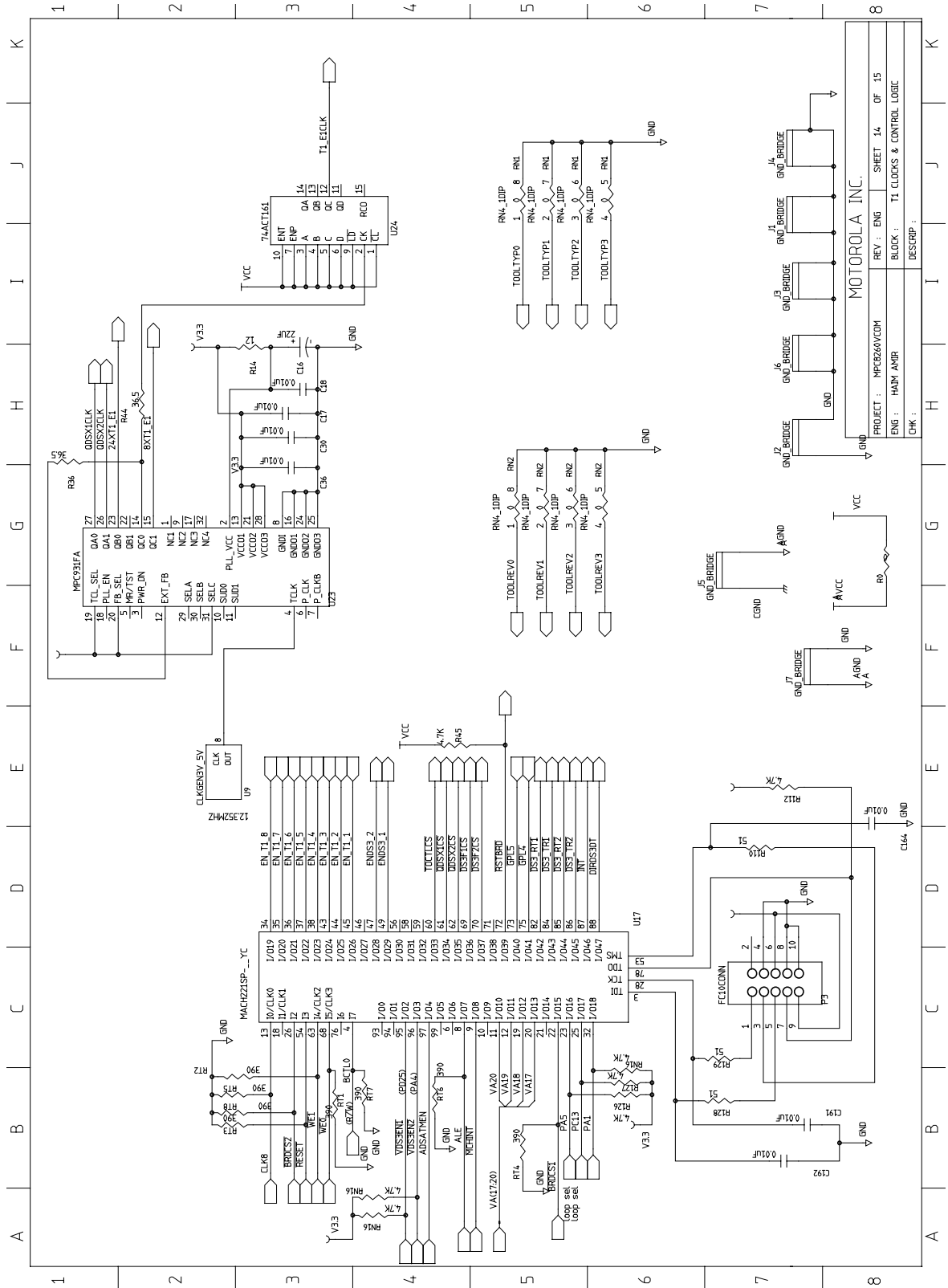


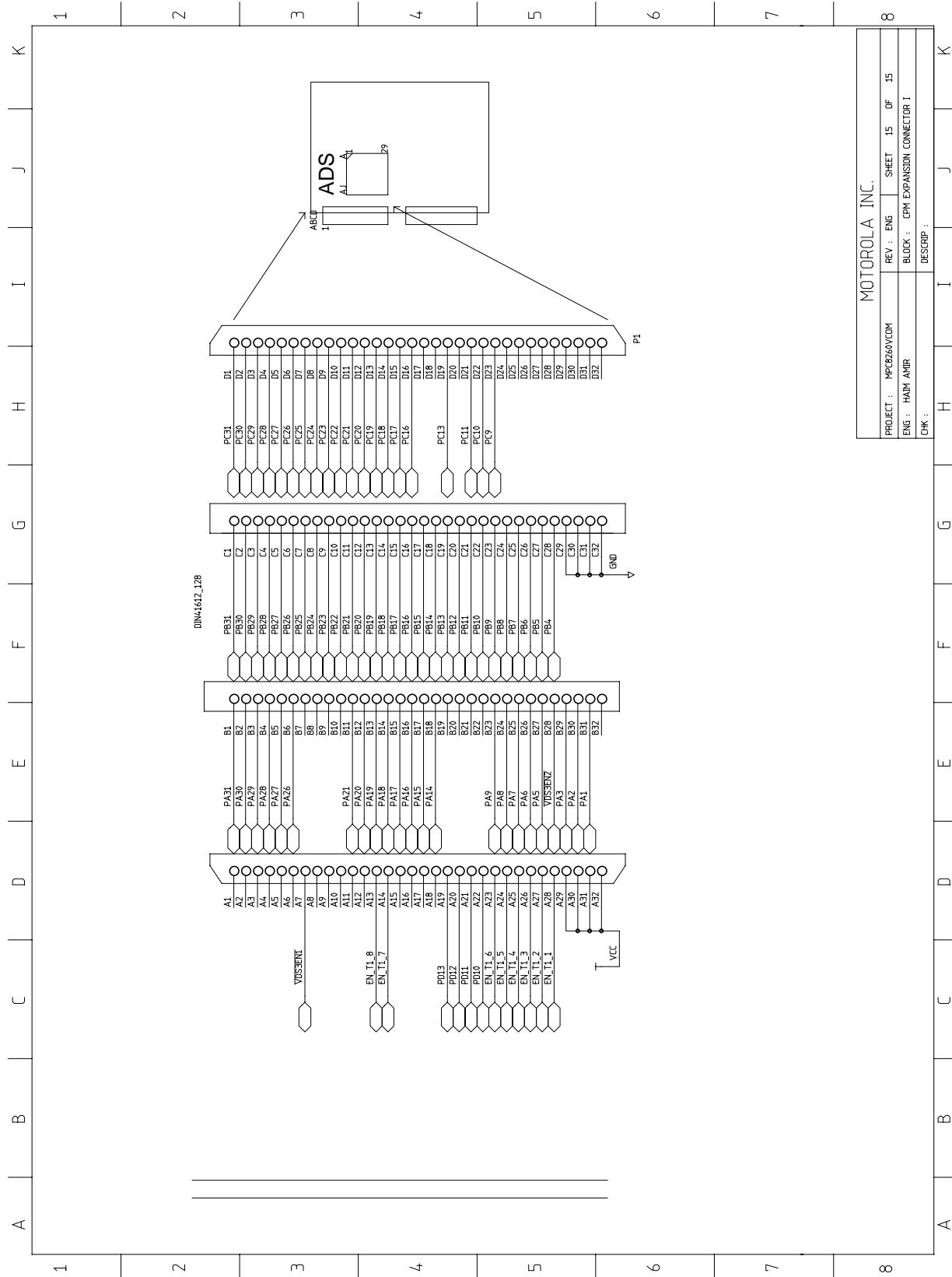


|               |             |           |                      |
|---------------|-------------|-----------|----------------------|
| MOTOROLA INC. |             |           |                      |
| PROJECT :     | MPC8260TCOM | REV :     | ENG                  |
| ENG :         | HAIM AMR    | BLOCK :   | DS3 2 LINE INTERFACE |
| CHK :         |             | DESCRIP : |                      |









|               |             |           |                           |
|---------------|-------------|-----------|---------------------------|
| MOTOROLA INC. |             |           |                           |
| PROJECT :     | MPC8260TCOM | REV :     | ENG                       |
| ENG :         | HAIM AMR    | SHEET :   | 15 OF 15                  |
| CHK :         |             | BLOCK :   | CPM EXPANSION CONNECTOR I |
|               |             | DESCRIP : |                           |

## CHAPTER 4 - SUPPORT INFORMATION

### 4•1 INTRODUCTION

This chapter provides the interconnection signals and the parts list of the MPC8260TCOM board.

### 4•2 INTERCONNECT SIGNALS

The MPC8260TCOM board interconnects with external devices through the following connectors:

- P1 is a 128 pin connector which includes all the MPC8260 I/O signals needed by the 8260TCOM board. It connects the 8260TCOM to the 8260ADS.
- P2 is a 128 pin connector which include the address, data, control and status signals. it connects the 8260TCOM to the 8260ADS.
- P3 is the ISP connector for programming the MACH.
- P4 is the RJ45 connector for the Fast Ethernet; this connector is for the 2 fast ethernet ports.
- P5 - P8 are the BNC connectors for the 2 x DS3, 2 of the connectors are for transmit and 2 for receive.
- P9 is a 8 x 8 pin, RJ45 connector for the 8 x T1.

#### 4•2•1 P1 PORTS CONNECTOR

**Table 5: P1 PORT D (A row)**

| A   |               |      |  |
|-----|---------------|------|--|
| A1  |               | NC   |  |
| A2  |               | NC   |  |
| A3  |               | NC   |  |
| A4  |               | NC   |  |
| A5  |               | NC   |  |
| A6  |               | NC   |  |
| A7  | VDS3EN1~      | PD25 | This signal is the DS3_1 enable request; if T1_1, T1_7 and T1_8 are not enabled the DS3_1 is automatically enabled if PD25 is low. |
| A8  |               | NC   |  |
| A9  |               | NC   |  |
| A10 |               | NC   |  |
| A11 |               | NC   |  |
| A12 |               | NC   |  |
| A13 | EN_T1_8       | PD19 | Enable T1_8; if this signal is low T1_8 is enabled and DS3_1 and DS3_2 are disabled  |
| A14 | EN_T1_7       | PD18 | Enable T1_7; if this signal is low T1_7 is enabled and DS3_1 is disabled   |
| A15 |               | NC   |  |
| A16 |               | NC   |  |
| A17 |               | NC   |  |
| A18 |               | NC   |  |
| A19 | TDMB1-L1TXD   | PD13 | T1_2 TXD; this function use TDMB1  |
| A20 | TDMB1-L1RXD   | PD12 | T1_2 RXD; this function use TDMB1  |
| A21 | TDMB1-L1TSYNC | PD11 | T1_2 TSYNC; this function use TDMB1  |

**Table 5: P1 PORT D (A row)**

| A   |                       |   |
|-----|-----------------------|---|
| A22 | PD10<br>TDMB1-L1RSYNC | T1_2 RSYNC; this function use TDMB1                                     |
| A23 | PD9<br>EN_T1_6        | Enable T1_6 signal. If this signal is low then T1_6 is enabled          |
| A24 | PD8<br>EN_T1_5        | Enable T1_5; if this signal is low T1_5 is enable and DS3_2 is disabled |
| A25 | PD7<br>EN_T1_4        | Enable T1_4; if this signal is low T1_4 is enable and DS3_2 is disabled |
| A26 | PD6<br>EN_T1_3        | Enable T1_3; if this signal is low T1_3 is enable and DS3_2 is disabled |
| A27 | PD5<br>EN_T1_2        | Enable T1_2 signal. If this signal is low then T1_2 is enabled          |
| A28 | PD4<br>EN_T1_1        | Enable T1_1; if this signal is low T1_1 is enable and DS3_1 is disabled |
| A29 | VCC                   | through these pins the TCOM gets the POWER (VCC).                       |
| A30 | VCC                   |   |
| A31 | VCC                   |   |
| A32 | VCC                   |   |

**Table 6: P1 PORT A (B row)**

| B   |                             |  |
|-----|-----------------------------|--|
| B1  | PA31<br>MIICOL/ATM8-TxEnb   | Fast Ethernet FCC1 MIICOL signal or ATM8 on ADS TxEnb signal.    |
| B2  | PA30<br>MIICRS/ATM8-TxClav  | Fast Ethernet FCC1 MIICRS signal or ATM8 on ADS TxClav signal    |
| B3  | PA29<br>MIITXER/ATM8-TxSOC  | Fast Ethernet FCC1 MIITXER signal or ATM8 on ADS Txsoc signal    |
| B4  | PA28<br>MIITXEN/ATM8-RxEnb  | Fast Ethernet FCC1 MIITXEN signal or ATM8 on ADS RxEnb signal    |
| B5  | PA27<br>MIIRXDV/ATM8-RxSOC  | Fast Ethernet FCC1 MIIRXDV signal or ATM8 on ADS RxSoc signal    |
| B6  | PA26<br>MIIRXER/ATM8-RxClav | Fast Ethernet FCC1 MIIRxClav signal or ATM8 on ADS RxClav signal |
| B7  | NC                          |  |
| B8  | NC                          |  |
| B9  | NC                          |  |
| B10 | NC                          |  |
| B11 | PA21<br>MIITXD3/ATM8-TXD4   | Fast Ethernet FCC1 MIITXD3 signal or ATM8 on ADS TXD4 signal     |
| B12 | PA20<br>MIITXD2/ATM8-TXD5   | Fast Ethernet FCC1 MIITXD2 signal or ATM8 on ADS TXD5 signal     |
| B13 | PA19<br>MIITXD1/ATM8-TXD6   | Fast Ethernet FCC1 MIITXD1 signal or ATM8 on ADS TXD6 signal     |
| B14 | PA18<br>MIITXD0/ATM8-TXD7   | Fast Ethernet FCC1 MIITXD0 signal or ATM8 on ADS TXD7 signal     |
| B15 | PA17<br>MIIRXD0/ATM8-RXD7   | Fast Ethernet FCC1 MIIRXD0 signal or ATM8 on ADS RXD7 signal     |
| B16 | PA16<br>MIIRXD1/ATM8-RXD6   | Fast Ethernet FCC1 MIIRXD1 signal or ATM8 on ADS RXD6 signal     |
| B17 | PA15<br>MIIRXD2/ATM8-RXD5   | Fast Ethernet FCC1 MIIRXD2 signal or ATM8 on ADS RXD5 signal     |
| B18 | PA14<br>MIIRXD3/ATM8-RXD4   | Fast Ethernet FCC1 MIIRXD3 signal or ATM8 on ADS RXD4 signal     |
| B19 | NC                          |  |

**Table 6: P1 PORT A (B row)**

| B   |                                      |   |
|-----|--------------------------------------|---|
| B20 | NC                                   |   |
| B21 | NC                                   |   |
| B22 | NC                                   |   |
| B23 | PA9<br>DS3-TXD0/TDMA1-L1TXD0         | DS3_1 FCC2 TXD0 signal or T1_1 TXD signal; if T1_1 is enable DS3_1 is disable.  |
| B24 | PA8<br>DS3-RXD0/TDMA1-L1RXD0         | DS3_1 FCC2 RXD0 signal or T1_1 RXD signal; if T1_1 is enable DS3_1 is disable.  |
| B25 | PA7<br>DS3-TXSYNC/TDMA1-L1TSYNC      | DS3_1 FCC2 TSYNC signal or T1_1 TSYNC signal; if T1_1 is enable DS3_1 is disable.   |
| B26 | PA6<br>DS3-RXSYNC/TDMA1-L1RSYNC      | DS3_1 FCC2 RSYNC signal or T1_1 RSYNC signal; if T1_1 is enable DS3_1 is disable.   |
| B27 | PA5                                  | PA5 is used to select one of the DS3_1 Loopback modes.<br>DS3_1 RT will be low if PA5 and PA1 will be low.<br>DS3_1 TR will be low if PA5 will be high and PA1 will be low. |
| B28 | PA4                                  | DS3 2 is enabled by driving PA4 to low and if all of T1-1, T1-7, T1-8 are disabled  |
| B29 | PA3<br>DS3-RXD1/TDM2-RXCLK(clock19)  | DS3_2 FCC3 RXD1 signal or T1_8 RXCLK signal. if T1_8 is enable DS3_2 is disable.  |
| B30 | PA2<br>DS3-TXCLK/TDM2-TXCLK(clock20) | DS3_1 FCC2 TXCLK signal or T1_8 TXCLK signal. if T1_8 is enable DS3_1 is disable.   |
| B31 | PA1<br>Enable DS3 loop back          | If PA1 is low a loop back modes on DS3 1 & 2 is enabled   |
| B32 | NC                                   |   |

**Table 7: P1 PORT B (C row)**

| C   |  |  |
|-----|--|--|
| C1  | PB31<br>TDMB2-L1TXD/ <i>MIITXER</i>            | T1_6 TXD signal or FCC2 MIITXER signal on ADS.   |
| C2  | PB30<br>TDMB2-L1RXD/ <i>ATM8-MIIRXDV</i>       | T1_6 RXD signal or FCC2 MIIRXDV signal on ADS.   |
| C3  | PB29<br>TDMB2-L1RSYNC/ <i>MIITXEN</i>          | T1_6 RSYNC signal or FCC2 MIITXEN signal on ADS.   |
| C4  | PB28<br>TDMB2-L1TSYNC/ <i>MIIRXER</i>          | T1_6 TSYNC signal or FCC2 MIIRXER signal on ADS.   |
| C5  | PB27<br>TDMC2-L1TXD/ <i>MIICOL</i>             | T1_7 TXD signal or FCC2 MIICOL signal on ADS.  |
| C6  | PB26<br>TDMC2-L1RXD/ <i>MIICRS</i>             | T1_7 RXD signal or FCC2 MIICRS signal on ADS.  |
| C7  | PB25<br>DS3-TXD3/TDMC2-L1TSYNC/ <i>MIITXD3</i> | T1_7 TSYNC signal or FCC2 DS3_1 TXD3 signal. If T1_7 is enable DS3_1 is disable. This signal can be FCC2 MIITXD3 signal on ADS.      |
| C8  | PB24<br>DS3-RXD3/TDMC2-L1RSYNC/ <i>MIITXD2</i> | T1_7 RSYNC signal or FCC2 DS3_1 RXD3 signal. If T1_7 is enable DS3_1 is disable. This signal can be FCC2 MIITXD2 signal on ADS.      |
| C9  | PB23<br>DS3-RXD2/TDM2-L1TXD/ <i>MIITXD1</i>    | T1_8 TXD signal or FCC2 DS3_1 RXD2 signal. If T1_8 is enable DS3_1 is disable. This signal can be FCC2 MIITXD1 signal on ADS.        |
| C10 | PB22/DS3-RXD1/TDM2-L1RXD/ <i>MIITXD0</i>       | T1_8 RXD signal or FCC2 DS3_1 RXD1 signal. If T1_8 signal is enable DS3_1 is disable. This signal can be FCC2 MIITXD0 signal on ADS. |
| C11 | PB21<br>DS3-TXD2/TDM2-L1TSYNC/ <i>MIIRXD0</i>  | T1_8 TSYNC signal or FCC2 DS3_1 TXD2 signal. If T1_8 signal is enable DS3_1 is disable. This signal can be FCC2 MIIRXD0 signal.      |
| C12 | PB20<br>DS3-TXD1/TDM2-L1RSYNC/ <i>MIIRXD1</i>  | T1_8 RSYNC signal or FCC2 DS3_1 TXD1 signal. If T1_8 signal is enable DS3_1 is disable. This signal can be FCC2 MIIRXD1 signal.      |
| C13 | PB19<br>DS3-RXD3/ <i>MIIRXD2</i>               | DS3_1 RXD3 signal on FCC3 or MIIRXD2 signal on FCC2 on ADS.  |
| C14 | PB18<br>DS3-RXD2/ <i>MIIRXD3</i>               | DS3_1 RXD2 signal on FCC3 or MIIRXD3 signal on FCC2 on ADS.  |
| C15 | PB17<br>MIIRXDV                                | FE_2 MIIRXDV signal on FCC3.   |

**Table 7: P1 PORT B (C row)**

| C   |                                       |  |
|-----|---------------------------------------|--|
| C16 | MIIRXER PB16                          | FE_2 MIIRXER signal on FCC3.   |
| C17 | MIITXER/TDMC1-L1TXD PB15              | T1_3 TXD signal or FE_2 MIITXER signal on FCC3 .   |
| C18 | MIITXEN/TDMC1-L1RXD PB14              | T1_3 RXD signal or FE_2 MIITXEN signal on FCC3 .   |
| C19 | MIICOL/DS3-TXD1/TDMC1-L1TSYNC PB13    | T1_3 TSYNC or FE_2 MIICOL signal on FCC3 or DS3_2 TXD1 signal on FCC3.   |
| C20 | MIICRS/TDMC1-L1RSYNC PB12             | T1_3 RSYNC signal or FE_2 MIICRS signal on FCC3.   |
| C21 | MIIRXD3/TDMD1-L1TXD PB11              | T1_3 TXD signal or FE_2 MIIRXD3 signal on FCC3.  |
| C22 | MIIRXD2/TDMD1-L1RXD PB10              | T1_4 RXD signal or FE_2 MIIRXD2 signal on FCC3.  |
| C23 | MIIRXD1/DS3-TXD2/TDMD1-L1TSYNC PB9    | T1_4 TSYNC signal or FE_2 MIIRXD1 signal on FCC3 or DS3_2 TXD2 signal. If T1_4 is enable DS3_2 is disable.               |
| C24 | MIIRXD0/TDMD1-L1RSYNC PB8             | T1_4 RSYNC signal or FE_2 MIIRXD0 signal on FCC3.  |
| C25 | MIITXD0/DS3-TXD0/TDMA2-L1TXD PB7      | T1_5 TXD signal or FE_2 MIITXD0 signal on FCC3 or DS3_2 TXD0 signal on FCC3. If T1_5 is enable then DS3_2 is disable.    |
| C26 | MIITXD1/DS3-RXD0/TDMA2-L1RXD PB6      | T1_5 RXD signal or FE_2 MIITXD1 signal on FCC3 or DS3_2 RXD0 signal on FCC3. If T1_5 is enable then DS3_2 is disable.    |
| C27 | MIITXD2/DS3-TXSYNC//TDMA2-L1TSYNC PB5 | T1_5 TSYNC signal or FE_2 MIITXD2 signal on FCC3 or DS3_2 TSYNC signal on FCC3. If T1_5 is enable then DS3_2 is disable. |
| C28 | MIITXD3/DS3-RXSYNC/TDMA2-L1RSYNC PB4  | T1_5 RSYNC signal or FE_2 MIITXD3 signal on FCC3 or DS3_2 RSYNC signal on FCC3. If T1_5 is enable then DS3_2 is disable. |
| C29 | GND                                   | through these pins the TCOM gets POWER (GND).  |
| C30 | GND                                   |  |
| C31 | GND                                   |  |
| C32 | GND                                   |  |

**Table 8: P1 PORT C (D row)**

| D   |  |   |
|-----|--|---|
| D1  | DS3-RXCLK(clock1)/TDMA1-RXCLK(clock1) PC31   | T1_1 RXCLK signal or DS3_1 RXCLK signal on FCC2           |
| D2  | TDMA1-TXCLK(clock2) PC30                     | T1_1 TXCLK signal.  |
| D3  | TDMC2-RXCLK(clock3) PC29                     | T1_7 RXCLK signal.  |
| D4  | TDMC2-TXCLK(clock4) PC28                     | T1_7 TXCLK signal.  |
| D5  | DS3-RXCLK(clock5)/TDMC1-L1RXCLK(clock5) PC27 | T1_3 RXCLK signal or DS3_2 RXCLK on FCC3                  |
| D6  | DS3-TXCLK(clock6)/TDMC1-L1TXCLK(clock6) PC26 | T1_3 TXCLK signal or DS3_2 TXCLK on FCC3.                 |
| D7  | TDMD1-RXCLK(clock7) PC25                     | T1_4 RXCLK signal.  |
| D8  | TDMD1-TXCLK(clock8) PC24                     | T1_4 TXCLK signal   |
| D9  | TDMB1-RXCLK(clock9) PC23                     | T1_2 RXCLK signal.  |
| D10 | TDMB1-TXCLK(clock10) PC22                    | T1_2 TXCLK signal.  |
| D11 | MIIRXCLK(clock11)/ATM8-RxClk PC21            | FE_1 MIIRXCLK signal on FCC1 or ATM8 RxClk signal on ADS. |

**Table 8: P1 PORT C (D row)**

| D   |  |   |
|-----|--|---|
| D12 | PC20<br>MIITXCLK(clock12)/ <i>ATM8-TxCk</i>    | FE_1 MIITXCLK signal on FCC1 or ATM8 TxClk signal on ADS.   |
| D13 | PC19<br>TDMA2-/RXCLK(clock13)/ <i>MIIRXCLK</i> | T1_5 RXCLK signal or FE_0 MIIRXCLK signal on ADS.   |
| D14 | PC18<br>TDMA2-TXCLK(clock14)/ <i>MIITXCLK</i>  | T1_5 TXCLK signal or FE_0 MIITXCLK signal on ADS.   |
| D15 | PC17<br>MIIRXCLK(clock15)/TDMB2-RXCLK          | T1_6 RXCLK signal or FE_2 MIIRXCLK signal on FCC3   |
| D16 | PC16<br>MIITXCLK(clock16)/TDMB2-TXCLK          | T1_6 TXCLK signal or FE_2 MIITXCLK signal on FCC3   |
| D17 | NC   |   |
| D18 | NC   |   |
| D19 | PC13   | PC13 is used to select one of the DS3_1 Loopback.<br>DS3_2 RT will be low if PC13 and PA1 will be low.<br>DS3_2 TR will be low if PC13 will be high and PA1 will be low.                                  |
| D20 | NC   |   |
| D21 | DS3-TXD3<br>PC11                               | DS3_2 TXD3 signal on FCC3   |
| D22 | MIIMDC<br>PC10                                 | FE_(0,1,2) MIIMDC signal. The MDC signal is a GPIO that the user should configure for this purpose. The TCOM SW has a program for this configuration. The PMC8260 dose not have a special pin for MDC.    |
| D23 | MIIMDIO<br>PC9                                 | FE_(0,1,2) MIIMDIO signal. The MDIO signal is a GPIO that the user should configure for this purpose. The TCOM SW has a program for this configuration. The PMC8260 dose not have a special pin for MDIO. |
| D24 | NC   |   |
| D25 | NC   |   |
| D26 | NC   |   |
| D27 | NC   |   |
| D28 | NC   |   |
| D29 | NC   |   |
| D30 | NC   |   |
| D31 | NC   |   |
| D32 | NC   |   |

**4•2•2 P2 ADDRESS, DATA CONTROL and STATUS signals.**
**Table 9: P2 ADD and Power (A row)**

| A  |      |  |
|----|------|--|
| A1 | NC   |  |
| A2 | VA17 | Not Used.  |
| A3 | VA18 | PM4388 TOCTL (T1_1 - T1_8 FRAMER) CS signal uses !A20 & !A19 & !A18 & !BRDCS1 (CS6).<br>PM4314 QDSX (T1_1 - T1_4 LIU) CS signal uses !A20 & !A19 & A18 & !BRDCS1 (CS6),<br>PM4314 QDSX (T1_5 - T1_8 LIU) CS signal uses !A20 & A19 & !A18 & !BRDCS1 (CS6),<br>TXC-03401 DS3F ( DS3_1) CS signal uses !A20 & A19 & A18 & !BRDCS1 (CS6).<br>TXC-03401 DS3F (DS3_2) CS signal uses A20 & !A19 & !A18 & !BRDCS1 (CS6). |
| A4 | VA19 |  |
| A5 | VA20 |  |
| A6 | VA21 |  |
| A7 | VA22 | A21 is the MSB of the TOCTL device address bus. (PM4388).  |
| A8 | VA23 | A22 is one of the address bus signals of the TOCTL (PM4388).   |
|    |      | A23 of the address bus of the TOCTL and 2 QDSX (T1 LIU).   |

**Table 9: P2 ADD and Power (A row)**

| A   |        |  |
|-----|--------|--|
| A9  | VA24   | The address bus of the TOCTL, 2 QDSX (T1 LIU) and 2 DS3F FRAMER. |
| A10 | VA25   |  |
| A11 | VA26   |  |
| A12 | VA27   |  |
| A13 | VA28   |  |
| A14 | VA29   |  |
| A15 | VA30   |  |
| A16 | VA31   |  |
| A17 | NC     |  |
| A18 | NC     |  |
| A19 | NC     |  |
| A20 | 3.3V   | 3.3V POWER SUPPLY FOR THE TCOM BOARD FROM THE ADS.               |
| A21 | 3.3V   |  |
| A22 | 3.3V   |  |
| A23 | 3.3V   |  |
| A24 | 3.3V   |  |
| A25 | NC     |  |
| A26 | 5V VCC | 5V POWER SUPPLY FOR THE TCOM BOARD FROM THE ADS.                 |
| A27 | 5V VCC |  |
| A28 | 5V VCC |  |
| A29 | 5V VCC |  |
| A30 | 5V VCC |  |
| A31 | 5V VCC |  |
| A32 | 5V VCC |  |

**Table 10: TCOM STATUS (B row)**

| B   |          |  |
|-----|----------|--|
| B1  | GND      |  |
| B2  | GND      |  |
| B3  | GND      |  |
| B4  | DS3_TR1  | If this signal is low the DS3_1 is in TR loopback. It can be read through the ADS BCSR2.                         |
| B5  | DS3_RT1  | If this signal is low the DS3_1 is in RT loopback. It can be read through the ADS BCSR2.                         |
| B6  | DS3_TR2  | If this signal is low the DS3_2 is in TR loopback. It can be read through the ADS BCSR2.                         |
| B7  | DS3_RT2  | If this signal is low the DS3_2 is in RT loopback. It can be read through the ADS BCSR2.                         |
| B8  | ENDS3_1  | If this signal is low the DS3_1 is enable. It can be read through the ADS BCSR2.                                 |
| B9  | ENDS3_2  | If this signal is low the DS3_2 is enable. It can be read through the ADS BCSR2.                                 |
| B10 | NC       |  |
| B11 | NC       |  |
| B12 | TOOLREV0 | These 4 signals indicate through the BCSR2 on the ADS what is the rev of the 8260TCOM board connected to the ADS |
| B13 | TOOLREV1 |  |
| B14 | TOOLREV2 |  |
| B15 | TOOLREV3 |  |
| B16 | TOOLTYP0 | These 4 signals indicate through the BCSR2 on the ADS what type of the board is connected to the ADS             |
| B17 | TOOLTYP1 |  |
| B18 | TOOLTYP2 |  |
| B19 | TOOLTYP3 |  |
| B20 | NC       |  |



**Table 10: TCOM STATUS (B row)**

| B   |        |   |
|-----|--------|---|
| B21 | 3.3V   | POWER 3.3V supply to the TCOM from the ADS. |
| B22 | 3.3V   |   |
| B23 | 3.3V   |   |
| B24 | NC     |   |
| B25 | VCC 5V | POWER 5V supply to the TCOM from the ADS.   |
| B26 | VCC 5V |   |
| B27 | VCC 5V |   |
| B28 | VCC 5V |   |
| B29 | VCC 5V |   |
| B30 | VCC 5V |   |
| B31 | VCC 5V |   |
| B32 | VCC 5V |   |

**Table 11: DATA and Control signals. (C row)**

| C   |                 |   |
|-----|-----------------|---|
| C1  | <i>GND</i>      |   |
| C2  | <i>CLK8</i>     |   |
| C3  | <i>GND</i>      |   |
| C4  | <i>BRDCS1~</i>  | MPC8260 CS6 signal use together with A18,A19 and A20 to select one of the devices on the TCOM |
| C5  | <i>BRDCS2~</i>  | not used  |
| C6  | <i>GND</i>      |   |
| C7  | <i>ADSATMEN</i> | ADS ATM8 enable signal not used on the TCOM.  |
| C8  | <i>NC</i>       |   |
| C9  | <i>NC</i>       |   |
| C10 | <i>RESET~</i>   | MPC8260 HRESET signal.  |
| C11 | <i>NC</i>       |   |
| C12 | <i>INT~</i>     | MPC8260 INT7~ signal  |
| C13 | <i>GND</i>      |   |
| C14 | <i>VD0</i>      |   |
| C15 | <i>VD1</i>      | MPC8260 D0-D7 data bus. use as a data for the TOCTL,QDSX,DS3F devices.                        |
| C16 | <i>VD2</i>      |   |
| C17 | <i>VD3</i>      |   |
| C18 | <i>VD4</i>      |   |
| C19 | <i>VD5</i>      |   |
| C20 | <i>VD6</i>      |   |
| C21 | <i>VD7</i>      |   |
| C22 | <i>NC</i>       |   |
| C23 | <i>NC</i>       |   |
| C24 | <i>NC</i>       |   |
| C25 | <i>NC</i>       |   |
| C26 | <i>NC</i>       |   |
| C27 | <i>NC</i>       |   |
| C28 | <i>NC</i>       |   |
| C29 | <i>NC</i>       |   |
| C30 | <i>NC</i>       |   |
| C31 | <i>NC</i>       |   |

**Table 11: DATA and Control signals. (C row)**

|     |    |  |
|-----|----|--|
| C   |    |  |
| C32 | NC |  |

**Table 12: Control Signals. (D row)**

|     |       |  |
|-----|-------|--|
| D   |       |  |
| D1  | GND   |  |
| D2  | GND   |  |
| D3  | GND   |  |
| D4  | WE0~  | MPC8260 WE0~ signal. Not used  |
| D5  | WE1~  | MPC8260 WE0~ signal. Not used  |
| D6  | GND   |  |
| D7  | GPL0~ | MPC8260 GPL0~ signal. Used as an ALE signal for the DS3F.  |
| D8  | GPL1~ | MPC8260 GPL1~ signal used as an ADDRESS buffer or for the DS3F.  |
| D9  | GPL2~ | MPC8260 GPL2~ signal used as a read signal on the TCOM board.  |
| D10 | GPL3~ | MPC8260 GPL3~ signal used as a write signal on the TCOM board.   |
| D11 | GPL4~ | MPC8260 GPL4~ signal used as a DS3F buffer OE~ signal.   |
| D12 | GPL5~ | MPC8260 GPL5~ signal not used.   |
| D13 | GND   |  |
| D14 | ALE   | MPC8280 ALE signal not used.   |
| D15 | BCTL0 | MPC8260 BCTL0 signal used as a read/write signal. In the TCOM it is a direction signal for the data of the DS3F for the DS3_1 and DS3_2. |
| D16 | GND   |  |
| D17 | GND   |  |
| D18 | GND   |  |
| D19 | GND   |  |
| D20 | GND   |  |
| D21 | GND   |  |
| D22 | GND   |  |
| D23 | GND   |  |
| D24 | GND   |  |
| D25 | GND   |  |
| D26 | GND   |  |
| D27 | GND   |  |
| D28 | GND   |  |
| D29 | GND   |  |
| D30 | GND   |  |
| D31 | GND   |  |
| D32 | GND   |  |

Table 5-1 MPC8260TCOM Parts List

Table 6:

| DESCRIPTION                   | QUANTITY    | MANUFACTURER PART NUMBER | MANUFACTURER | MOT. PART NUMBER | LOCATION   |
|-------------------------------|-------------|--------------------------|--------------|------------------|--|
| 100NF 16V 10% X7R 0603 SMD    | 1<br>3<br>4 | B37931K9104K60           | SIEMENS      | 021-00118        | C1 C4 C7 C8 C9 C10 C11 C12<br>C13 C14 C15 C19 C20 C21 C22<br>C23 C24 C25 C28 C29 C31 C32<br>C33 C34 C35 C37 C38 C39 C40<br>C42 C46 C50 C54 C57 C58 C60<br>C66 C71 C72 C75 C76 C77 C78<br>C79 C80 C85 C87 C88 C89 C90<br>C91 C92 C94 C95 C97 C98 C99<br>C100 C101 C102 C104 C105<br>C106 C107 C109 C110 C111<br>C112 C114 C115 C117 C118<br>C119 C120 C122 C123 C124<br>C125 C126 C127 C132 C133<br>C135 C136 C138 C139 C140<br>C141 C142 C144 C145 C146<br>C147 C148 C162 C163 C165<br>C166 C167 C169 C170 C172<br>C174 C177 C178 C180 C182<br>C184 C185 C186 C187 C188<br>C189 C190 C193 C194 C195<br>C196 C197 C198 C199 C200<br>C201 C202 C204 C209 C213<br>C214 C215 C216 C217 C218<br>C219 C220 |
| 100UF/10V TNT D SMT 10%       | 4           | B45196-H2107K            | SIEMENS      | 023-00038        | C2 C3 C5 C6  |
| 22uF 25V/10% SIZE D T/R SMD   | 1           | TAJD226K025R             | AVX          | 023-00048        | C16  |
| 10NF 50V 10% SMD 1206         | 1<br>7      | 1206 5C 103K ATJ         | AVX          | 021-00070        | C17 C18 C30 C36 C43 C51 C61<br>C62 C63 C67 C68 C69 C83 C84<br>C164 C191 C192   |
| 10UF 25v 10% C TNT SMD        | 2<br>6      | B45196-H5106-K309        | SIEMENS      | 023-00027        | C26 C27 C41 C44 C45 C49 C52<br>C53 C59 C64 C65 C70 C128<br>C129 C130 C131 C150 C151<br>C203 C205 C206 C207 C208<br>C210 C211 C212  |
| 18PF 5% 50V COG 1206 SMD      | 4           | 12065A180JAT             | AVX          | 021-00128        | C47 C48 C55 C56  |
| 0.047UF (47nf) 50V 10% 12     | 8.          | AV12065C473KATJ          | AVX          | 021-00095        | C73 C74 C81 C82 C134 C137<br>C143 C149   |
| 0.47UF 50V 1812 SMD           | 8.          | 1812 5C 474K ATJ         | AVX          | 021-00113        | C86 C93 C96 C103 C108 C113<br>C116 C121  |
| 1nF 2KV X7R 1210 SMD CERRAMIC | 2           | 1210B102K202NT           | AVX          | 021-00126        | C152 C153  |
| 0.68uF 50V SMD X7R 1812 T     | 8           | 18125C684KAT2A           | AVX          | 021-00138        | C154 C155 C156 C157 C158<br>C159 C160 C161   |
| 1000P (1nF) 50V 10% 1206      | 8.          | AVX12065C102KA           | AVX          | 021-00105        | C168,C171,C173,C175<br>C176,C179,C181,C183.  |

**Table 6:**

| DESCRIPTION                | QUANTITY | MANUFACTURER PART NUMBER | MANUFACTURER | MOT. PART NUMBER | LOCATION   |
|----------------------------|----------|--------------------------|--------------|------------------|--|
| GND BRIDGE 2.54MM GOLD     | 7        | PD 999 11 11010          | PRECIDIP     | 022-00012        | J1 J2 J3 J4 J5 J6 J7   |
| Impedance 45-95 SMD FERRIT | 36       | 2743021447               | FAIR RITE    | 024-00013        | L1-L36   |
| GREEN LED SMD              | 18       | LG-T670-HK               | SIEMENS      | 048-01001        | LD1 LD2 LD3 LD4 LD5 LD6 LD8 LD9 LD13 LD16 LD17 LD18 LD19 LD20 LD21 LD22 LD23 LD24                  |
| RED LED SMD                | 6        | LS-T670-HK               | SIEMENS      | 048-01002        | LD7 LD10 LD11 LD12 LD14 LD15   |
| 128 PIN MALE PC 90' DIN C  | 2        | 023816                   | ERNI         | 028-00279        | P1 P2  |
| 10PIN TERM STRIP SHORT SMD | 1        | TSM10501-SDV AP          | SAMTEC       | 028-00171        | P3   |
| 2 PORT SHILDED 90' MODULA  | 1.       | 43223-8128               | MOLEX        | 009-00435        | P4   |
| BNC FEM STRGHT FOR PC      | 40       | 73133-5003               | MOLEX        | 009-00226        | P5 P6 P7 P8  |
| 8 PORT SHILDED 90' MODULA  | 1.       | 43223-8182               | MOLEX        | 009-00436        | P9   |
| 0 OHM 1% 1/4W 1206 SMD     | 9        | D25 000RFCS              | ROEDERS TEIN | 006-00252        | R0 R97 R99 R101 R102 R103 R105 R107 R108   |
| 390 ohm 1% 0603 SMD T/R    | 16       | CR0603 390RF             | DRALORIK     | 006-00384        | R1 R2 R3 R4 R5 R6 R9 R15 R16 R17 R19 R20 R23 R24 R25 R26 RT1 RT2 RT3 RT4 RT5 RT6 RT7 RT8 R130 R131 |
| 22 OHM 5%1/8W 1206 SMD     | 15       | D25 022 RJSC             | ROEDERS TEIN | 006-00301        | R7 R10 R18 R21 R22 R38 R40 R41 R68 R115 R116 R117 R119 R121 R122 R123 R125                         |
| 54.9 OHM 1% 1206 SMD T/R   | 5.       | D25 54R9FCS              | ROEDERS TEIN | 006-00354        | R8 R11 R12 R13 R31.  |
| 12 OHM 1% 1206 SMD T/R     | 1.       | D25 012RFCS              | ROEDERS TEIN | 006-00355        | R14  |
| 33.2 1% 1/8W 1206 SMD      | 2        | D25 33R2FCS              | ROEDERS TEIN | 006-00286        | R27 R32.   |
| 4.7K 1% 1206 SMD           | 21       | D25 04K7FCS              | ROEDERS TEIN | 006-00321        | R28 R33 R37 R39 R45 R46 R47 R48 R49 R50 R55 R64 R65 R66 R67 R109 R111 R112 R113 R126 R127.         |
| 1K 1% 1/4W METAL 1206      | 6        | D25001KFCS               | DRALORIK     | 006-00257        | R29 R30 R34 R35 R42 R43  |
| 36 ohm 5% 1206 SMD T/R     | 2        | D25 036RFCS              | DRALORIK     | 006-00398        | R36 R44.   |
| 100 OHM 1% 1/4W 1206       | 2        | D25-100RFCS              | ROEDERS TEIN | 006-00240        | R51 R53  |
| 22.1K 1% 1/4W SMD 1206     | 2        | D25-22K1FCS              | DRALORIK     | 006-00236        | R52 R54  |
| 316K 1% 1206 SMD T/R       | 8.       | D25 316KFCS              | ROEDERS TEIN | 006-00353        | R56 R57 R62 R63 R73 R76 R77 R80  |

Table 6:

| DESCRIPTION                | QUANTITY | MANUFACTURER PART NUMBER | MANUFACTURER | MOT. PART NUMBER | LOCATION  |
|----------------------------|----------|--------------------------|--------------|------------------|---|
| 93.1 OHM 1% 1206 SMD T/R   | 8.       | D25 93R1FCS              | ROEDERS TEIN | 006-00352        | R58 R59 R60 R61 R74 R75 R78 R79   |
| R 49,9 OHM 1% SMD 1206     | 16       | D25 49R9FCS              | ROEDERS TEIN | 006-00192        | R69 R70 R71 R72 R85 R86 R87 R88 R89 R90 R91 R92 R93 R94 R95 R96   |
| 75 OHM 5%1/4W MTL 1206     | 8        | D25 075RJCS              | ROEDERS TEIN | 006-00260        | R81 R82 R83 R84 R156 R157 R158 R159   |
| 309 OHM 1% 1206 SMD T/R    | 8.       | D25 309RFCS              | ROEDERS TEIN | 006-00351        | R98 R100 R104 R106 R114 R118 R120 R124.   |
| 51.1 1% 1/4W 1206 SMD      | 3        | D25 51R1FCS              | ROEDERS TEIN | 006-00221        | R110 R128 R129  |
| 191 OHM 1% 1206 SMD T/R    | 22       | D25 191RFCS              | ROEDERS TEIN | 006-00344        | R132 R133 R134 R135 R136 R137 R138 R139 R140 R141 R142 R143 R144 R145 R147 R148 R150 R151 R152 R153 R154 R155 |
| RES 330 OHM SMD 5% 1206    | 2        | D25 330RJCS              | ROEDERS TEIN | 006-00191        | R146 R149   |
| 0ohm 5% 4R 8P SMD CHIP R   | 10       | CRA06S0803 000 RT        | DALE         | 051-00067        | RN1 RN2   |
| 51ohm 5% 4R 8P SMD CHIP R  | 10       | CRA06S0803510JR          | DALE         | 051-00070        | RN3 RN4 RN5 RN6 RN7   |
| 22ohm 5% 4R 8P SMD CHIP R  | 10       | CRA06S0803220JR          | DALE         | 051-00068        | RN8 RN9 RN10 RN11 RN12 RN13 RN14 RN15   |
| 4.7K 13R 14P SMD T/R       | 1        | SOMC1401472              | DALE         | 051-00036        | RN16  |
| 10K 5% 14P 13R SMD T/R     | 1        | SOMC 1401103J TR         | DALE         | 051-00046        | RN17  |
| ETHERNET TRANSCEIVER LXT9  | 2        | LXT970QC                 | LEVEL ONE    | 051-LXT970QC     | U1 U2   |
| MC74LCX541DW SMD           | 11       | MC74LCX541DW             | MOTOROLA     | 051-74LCX541 DW  | U3 U4 U5 U6 U7 U25 U26 U27 U28 U29 U31  |
| OCTAL T1 FRAMER PM4388-R1  | 1        | PM4388-RI                | PMC SIERA    | 051-PM4388-RI    | U8  |
| 16.384MHz 3.3V 4P CRYSC    | 1        | M3H16FCD                 |              | 048-00103        | U9 for E1   |
| 12.352MHz 3.3V 4P CRYSC    | 1        | M3H16FCD                 |              | 048-00104        | U9 for T1   |
| TRANSFORMER TG22-3506      | 2        | TG22-3506ND              | HALO         | 091-TG22-3506ND  | U10 U11   |
| DS3 FRAMER TXC-03401B      | 2        | TXC-03401B               | TRANSWITCH   | 051-TXC03401 B   | U12 U13   |
| QUAD T1/E1 INTERFACE PM431 | 2        | PM4314-RI                | PMC SIERA    | 051-PM4314-RI    | U14 U15   |
| 44.736MHz 5V 8P CRYSC      | 1        | MH16FDD                  |              | 048-00105        | U16   |

**Table 6:**

| DESCRIPTION                      | QUANTITY | MANUFACTURER PART NUMBER | MANUFACTURER | MOT. PART NUMBER | LOCATION |
|----------------------------------|----------|--------------------------|--------------|------------------|----------|
| MACH221SP-15YC                   | 1        | MACH221SP-7YC            | AMD          | 051-MACH221SP-15 | U17      |
| MC74LCX245DW SMD                 | 1        | MC74LCX245DW             | MOTOROLA     | 051-74LCX245D    | U18      |
| T1/E1/CEPT QUAD PORT TRANSFORMER | 2        | ST5170T                  | VALOR        | 051-ST5170T      | U19 U20  |
| LINE INTERFACE MODULE TXC-20153G | 2        | TXC-20153G               | TRANSWITCH   | 051-TXC20153G    | U21 U22  |
| PLL MPC931FA                     | 1        | MPC931FA                 | MOTOROLA     | 051-MPC931FA     | U23      |
| 74ACT161D SMD                    | 1        | MC74ACT161D              | MOTOROLA     | 051-74ACT161D    | U24      |
| 74ACT244DW SMD                   | 1        | 74ACT244DW               | MOTOROLA     | 051-74ACT244D    | U30      |
| 14 PIN SMD SOCKET G/T            | 2        | 110-91-314-41-105        | PRECIDIP     | 009-00262        |          |
| Crystal 25MHz                    | 2        | MA505 +/-50PPM 25MHz     | EPSON        | 048-00099        | Y1-Y2    |
| RUBBER LEGS                      | 7        | SJ5018 BLACK             | 3M           | 107-01325        |          |

**4•2•3 MPC8260TCOM netlist**

/8XT1E1PL R44(2) U24(2);  
 /8XT1\_E1 I3(1) U8(123) U23(15);  
 /ADSATMEN P2(C7) U17(97);  
 /ALE P2(D14) RT6(1) U17(8);  
 /BCTL0 P2(D15) RT7(1) U17(4);  
 /BQ1TCLK1 R17(1) U8(10) U14(78) U26(5);  
 /BQ1TCLK2 R16(1) U7(5) U8(12) U14(75);  
 /BQ1TCLK3 R20(1) U6(5) U8(14) U14(72);  
 /BQ1TCLK4 R24(1) U8(16) U14(69) U27(5);  
 /BQ2TCLK5 R23(1) U4(5) U8(23) U15(78);  
 /BQ2TCLK6 R26(1) U3(5) U8(25) U15(75);  
 /BQ2TCLK7 R15(1) U8(27) U15(72) U25(5);  
 /BQ2TCLK8 R19(1) U5(5) U8(29) U15(69);  
 /BRDCS1~ P2(C4) RT4(1) U17(22);  
 /BRDCS2~ P2(C5) RT8(2) U17(26);  
 /BRICK1 R3(1) U8(96) U26(2);  
 /BRICK2 R9(1) U7(2) U8(91);  
 /BRICK3 R2(1) U6(2) U8(88);  
 /BRICK4 R5(1) U8(83) U27(2);

/BRICK6 R25(1) U3(2) U8(77);  
 /BRICK7 R1(1) U8(72) U25(2);  
 /BRICK8 R4(1) U5(2) U8(69);  
 /BRID1 U8(97) U26(4);  
 /BRID2 U7(4) U8(94);  
 /BRID3 U6(4) U8(89);  
 /BRID4 U8(84) U27(4);  
 /BRID5 U4(4) U8(81);  
 /BRID6 U3(4) U8(78);  
 /BRID7 U8(73) U25(4);  
 /BRID8 U5(4) U8(70);  
 /BRIFP1 U8(95) U26(3);  
 /BRIFP2 U7(3) U8(90);  
 /BRIFP3 U6(3) U8(87);  
 /BRIFP4 U8(82) U27(3);  
 /BRIFP5 U4(3) U8(79);  
 /BRIFP6 U3(3) U8(76);  
 /BRIFP7 U8(71) U25(3);  
 /BRIFP8 U5(3) U8(68);  
 /BTED1 U8(115) U26(13);  
 /BTED2 U7(13) U8(113);  
 /BTED3 U6(13) U8(111);  
 /BTED4 U8(109) U27(13);  
 /BTED5 U4(13) U8(105);  
 /BTED6 U3(13) U8(103);  
 /BTED7 U8(101) U25(13);  
 /BTED8 U5(13) U8(99);  
 /BTEFP1 U8(114) U26(6);  
 /BTEFP2 U7(6) U8(112);  
 /BTEFP3 U6(6) U8(110);  
 /BTEFP4 U8(106) U27(6);  
 /BTEFP5 U4(6) U8(104);  
 /BTEFP6 U3(6) U8(102);  
 /BTEFP7 U8(100) U25(6);  
 /BTEFP8 U5(6) U8(98);  
 /CLK8 P2(C2) RT5(2) U17(13);  
 /DIRDS3DT U17(88) U18(1);  
 /DS3CLK1 I19(1) I35(1) R130(1) U13(62) U13(52) U22(27) U30(18);  
 /DS3CLK2 I43(1) I54(1) R131(1) U12(52) U12(62) U21(27) U30(16);  
 /DS3F1CS~ I20(1) R49(2) U13(8) U17(69);  
 /DS3F2CS~ I44(1) R50(2) U12(8) U17(70);  
 /DS3F\_AD0 I34(1) U12(18) U13(18) U18(9) U31(11);  
 /DS3F\_AD1 I33(1) U12(19) U13(19) U18(8) U31(12);  
 /DS3F\_AD2 I32(1) U12(20) U13(20) U18(7) U31(13);  
 /DS3F\_AD3 I31(1) U12(21) U13(21) U18(6) U31(14);  
 /DS3F\_AD4 I30(1) U12(23) U13(23) U18(5) U31(15);  
 /DS3F\_AD5 I29(1) U12(24) U13(24) U18(4) U31(16);  
 /DS3F\_AD6 I28(1) U12(25) U13(25) U18(3) U31(17);  
 /DS3F\_AD7 I27(1) U12(26) U13(26) U18(2) U31(18);  
 /DS3RC1 U13(5) U22(33);  
 /DS3RC2 U12(5) U21(33);  
 /DS3RCLK1 RN15(5) U26(18) U28(14);  
 /DS3RCLK2 RN14(8) U6(18) U29(14);  
 /DS3RD0\_1 RN13(8) U26(16) U28(15);

/DS3RD1 U13(29) U22(29)  
 /DS3RD1\_1 RN13(7) U5(16) U28(16);  
 /DS3RD1\_2 RN14(7) U5(18) U29(16)  
 /DS3RD2 U12(29) U21(29);  
 /DS3RD2\_1 RN13(6) U5(7) U28(17)  
 /DS3RD2\_2 RN14(6) U29(17);  
 /DS3RD3\_1 RN13(5) U25(17) U28(18)  
 /DS3RD3\_2 RN14(5) U29(18);  
 /DS3RSYN1 RN15(6) U26(17) U28(13);  
 /DS3TC1 U13(1) U22(21);  
 /DS3TC2 U12(1) U21(21)  
 /DS3TCK\_1 RN15(7) U5(15) U28(12);  
 /DS3TCK\_2 R68(2) U6(15) U29(12)  
 /DS3TD1 U13(3) U22(23);  
 /DS3TD1\_1 RN12(3) U5(17) U13(59)  
 /DS3TD2 U12(3) U21(23);  
 /DS3TD2\_1 RN12(2) U5(14) U13(58)  
 /DS3TD3\_1 I39(1) RN12(8) U13(56) U25(14);  
 /DS3TSYN1 RN15(8) U26(14) U28(11);  
 /DS3\_RT1~ P2(B5) RN17(6) U17(82) U22(16);  
 /DS3\_RT2~ P2(B7) RN17(10) U17(85) U21(16);  
 /DS3\_TR1~ P2(B4) RN17(5) U17(84) U22(17);  
 /DS3\_TR2~ P2(B6) RN17(9) U17(86) U21(17);  
 /ENDS3\_1 P2(B8) R113(2) R144(1) U17(49) U28(1) U28(19);  
 /ENDS3\_2 P2(B9) R55(2) R147(1) U17(47) U29(1) U29(19);  
 /EN\_T1\_1 P1(A28) R136(1) RN16(2) U17(45) U26(19) U26(1);  
 /EN\_T1\_2 LD23(1) P1(A27) RN16(12) U7(1) U7(19) U17(44);  
 /EN\_T1\_3 P1(A26) R138(1) RN16(3) U6(1) U6(19) U17(43);  
 /EN\_T1\_4 LD21(1) P1(A25) RN16(11) U17(38) U27(19) U27(1);  
 /EN\_T1\_5 P1(A24) R140(1) RN16(4) U4(19) U4(1) U17(37);  
 /EN\_T1\_6 LD19(1) P1(A23) RN16(5) U3(19) U3(1) U17(36);  
 /EN\_T1\_7 LD18(1) P1(A14) RN16(6) U17(35) U25(1) U25(19);  
 /EN\_T1\_8 P1(A13) R143(1) RN16(7) U5(19) U5(1) U17(34);  
 /FECOL\_1 RN7(7) U1(64)  
 /FECOL\_2 RN5(7) U2(64);  
 /FECRS\_1 RN7(8) U1(1)  
 /FECRS\_2 RN5(8) U2(1);  
 /FERXCLK1 I10(1) R13(1) U1(54)  
 /FERXCLK2 I12(1) R11(1) U2(54);  
 /FERXD0\_1 RN6(8) U1(50)  
 /FERXD0\_2 RN4(5) U2(50);  
 /FERXD1\_1 RN6(7) U1(49)  
 /FERXD1\_2 RN4(6) U2(49);  
 /FERXD2\_1 RN6(6) U1(48)  
 /FERXD2\_2 RN4(7) U2(48);  
 /FERXD3\_1 RN6(5) U1(47)  
 /FERXD3\_2 RN4(8) U2(47) U27(7);  
 /FERX\_DV1 RN7(5) U1(51);  
 /FERX\_DV2 RN5(5) U2(51);  
 /FERX\_ER1 RN7(6) U1(55)  
 /FERX\_ER2 RN5(6) U2(55);  
 /FETXCLK1 I9(1) R32(1) U1(57)  
 /FETXCLK2 I11(1) R27(1) U2(57);  
 /FETXD0\_2 RN3(8) U2(59) U4(7) U12(60);



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| /FETXD1_2 | RN3(7) U2(60) U4(16) U29(15);                                 |
| /FETXD2_2 | RN3(6) U2(61) U4(14) U29(11);                                 |
| /FETXD3_2 | RN3(5) U2(62) U4(17) U29(13);                                 |
| /FETXD4_1 | R33(2) U1(63);  |
| /FETXD4_2 | R28(2) U2(63);  |
| /FETX_EN2 | R8(1) U2(58) U6(16)   |
| /FE_MDIO  | R31(1) U1(44);  |
| /GPL0~    | I23(1) I47(1) P2(D7) U12(10) U13(10)                          |
| /GPL1~    | P2(D8) U31(1) U31(19);  |
| /GPL2~    | I21(1) I45(1) P2(D9) U8(67) U12(12) U13(12) U14(11) U15(11);  |
| /GPL3~    | I22(1) I46(1) P2(D10) U8(66) U12(14) U13(14) U14(10) U15(10); |
| /GPL4~    | P2(D11) U17(75) U18(19)                                       |
| /GPL5~    | P2(D12) U17(73);  |
| /INT~     | P2(C12) R12(2) R37(2) U1(2) U8(40) U14(12) U15(12) U17(87);   |
| /MCHINT~  | U12(15) U13(15) U17(9)  |
| /PA1      | P1(B31) RN16(8) U17(32);                                      |
| /PA2      | P1(B30) RN15(2);  |
| /PA3      | P1(B29) RN14(2);  |
| /PA5      | P1(B27) R126(1) U17(23);                                      |
| /PA6      | P1(B26) RN15(3);  |
| /PA7      | P1(B25) RN15(1);  |
| /PA8      | P1(B24) RN13(1);  |
| /PA9      | P1(B23) U13(60) U26(7);                                       |
| /PA14     | P1(B18) RN6(4);   |
| /PA15     | P1(B17) RN6(3);   |
| /PA16     | P1(B16) RN6(2);   |
| /PA17     | P1(B15) RN6(1);   |
| /PA18     | P1(B14) U1(59);   |
| /PA19     | P1(B13) U1(60);   |
| /PA20     | P1(B12) U1(61);   |
| /PA21     | P1(B11) U1(62);   |
| /PA26     | P1(B6) RN7(3);  |
| /PA27     | P1(B5) RN7(4);  |
| /PA28     | P1(B4) U1(58);  |
| /PA29     | P1(B3) U1(56);  |
| /PA30     | P1(B2) RN7(1);  |
| /PA31     | P1(B1) RN7(2);  |
| /PB4      | P1(C28) RN3(4);   |
| /PB5      | P1(C27) RN3(3);   |
| /PB6      | P1(C26) RN3(2);   |
| /PB7      | P1(C25) RN3(1);   |
| /PB8      | P1(C24) RN4(4) RN10(3);                                       |
| /PB9      | P1(C23) R41(1) RN4(3) U12(58);                                |
| /PB10     | P1(C22) RN4(2) RN10(2);                                       |
| /PB11     | P1(C21) RN4(1);   |
| /PB12     | P1(C20) R10(1) RN5(1);  |
| /PB13     | P1(C19) R40(1) RN5(2) U12(59);                                |
| /PB14     | P1(C18) R8(2);  |
| /PB15     | P1(C17) U2(56) U6(7);   |
| /PB16     | P1(C16) RN5(3);   |
| /PB17     | P1(C15) RN5(4);   |
| /PB18     | P1(C14) RN14(3);  |
| /PB19     | P1(C13) RN14(4);  |
| /PB20     | P1(C12) RN12(6);  |

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| /PB21    | P1(C11) RN12(7);         |
| /PB22    | P1(C10) RN13(2);         |
| /PB23    | P1(C9) RN13(3);          |
| /PB24    | P1(C8) RN13(4);          |
| /PB25    | P1(C7) RN12(1);          |
| /PB26    | P1(C6) RN9(3);           |
| /PB27    | P1(C5) U25(7);           |
| /PB28    | P1(C4) RN11(1);          |
| /PB29    | P1(C3) RN11(4);          |
| /PB30    | P1(C2) RN11(3);          |
| /PB31    | P1(C1) U3(7);            |
| /PC9     | P1(D23) R31(2) U2(44);   |
| /PC10    | P1(D22) U1(45) U2(45);   |
| /PC11    | I68(1) P1(D21) U12(56);  |
| /PC13    | P1(D19) R127(1) U17(25); |
| /PC16    | P1(D16) R27(2) RN11(2);  |
| /PC17    | P1(D15) R7(1) R11(2);    |
| /PC18    | P1(D14) R22(2);          |
| /PC19    | P1(D13) R18(1);          |
| /PC20    | P1(D12) R32(2);          |
| /PC21    | P1(D11) R13(2);          |
| /PC22    | P1(D10) RN8(1);          |
| /PC23    | P1(D9) RN8(4);           |
| /PC24    | P1(D8) RN10(1);          |
| /PC25    | P1(D7) RN10(4);          |
| /PC26    | P1(D6) R68(1);           |
| /PC27    | P1(D5) RN14(1);          |
| /PC28    | P1(D4) RN9(2);           |
| /PC29    | P1(D3) RN9(4);           |
| /PC30    | P1(D2) R21(1);           |
| /PC31    | P1(D1) RN15(4);          |
| /PD10    | P1(A22) RN8(3);          |
| /PD11    | P1(A21) R38(1);          |
| /PD12    | P1(A20) RN8(2);          |
| /PD13    | P1(A19) U7(7);           |
| /Q1RCLK1 | U8(2) U14(98);           |
| /Q1RCLK2 | U8(4) U14(95);           |
| /Q1RCLK3 | U8(6) U14(90);           |
| /Q1RCLK4 | U8(8) U14(87);           |
| /Q1RXD1  | U8(1) U14(100);          |
| /Q1RXD2  | U8(3) U14(97);           |
| /Q1RXD3  | U8(5) U14(92);           |
| /Q1RXD4  | U8(7) U14(89);           |
| /Q1TXD1  | U8(9) U14(77);           |
| /Q1TXD2  | U8(11) U14(74);          |
| /Q1TXD3  | U8(13) U14(71);          |
| /Q1TXD4  | U8(15) U14(68);          |
| /Q1XCLKO | I7(1) U14(86);           |
| /Q2RCLK5 | U8(32) U15(98);          |
| /Q2RCLK6 | U8(34) U15(95);          |
| /Q2RCLK7 | U8(36) U15(90);          |
| /Q2RCLK8 | U8(38) U15(87);          |
| /Q2RXD5  | U8(31) U15(100);         |
| /Q2RXD6  | U8(33) U15(97);          |

/Q2RXD7 U8(35) U15(92);  
 /Q2RXD8 U8(37) U15(89);  
 /Q2TXD5 U8(22) U15(77);  
 /Q2TXD6 U8(24) U15(74);  
 /Q2TXD7 U8(26) U15(71);  
 /Q2TXD8 U8(28) U15(68);  
 /Q2XCLKO I8(1) U15(86);  
 /QDSX1CLK U14(79) U23(27);  
 /QDSX1CS~ R109(2) U14(9) U17(61);  
 /QDSX2CLK U15(79) U23(26);  
 /QDSX2CS~ R111(2) U15(9) U17(62);  
 /RBNC1N P7(2) R157(2) U22(49);  
 /RBNC1P P7(1) R157(1) U22(50);  
 /RBNC2N P5(2) R159(2) U21(49);  
 /RBNC2P P5(1) R159(1) U21(50);  
 /RESET~ P2(C10) RT3(2) U17(54);  
 /RN6R8 I53(1) R67(2) U12(49);  
 /RN6R9 I67(1) R66(2) U12(50);  
 /RSTBRD~ R45(2) U1(16) U2(16) U8(125) U8(39) U14(5) U14(7) U15(7) U15(5) U17(72);  
 /RXRING1 C177(1) R79(2) U14(127) U19(23);  
 /RXRING2 C178(1) R61(2) U14(104) U19(28);  
 /RXRING3 C180(1) R78(2) U14(40) U19(33);  
 /RXRING4 C182(1) R60(2) U14(63) U19(38);  
 /RXRING5 C169(1) R75(2) U15(127) U20(23);  
 /RXRING6 C170(1) R59(2) U15(104) U20(28);  
 /RXRING7 C172(1) R74(2) U15(40) U20(33);  
 /RXRING8 C174(1) R58(2) U15(63) U20(38);  
 /RXTIP1 R79(1) R120(1) U14(128);  
 /RXTIP2 R61(1) R104(1) U14(103);  
 /RXTIP3 R78(1) R106(1) U14(39);  
 /RXTIP4 R60(1) R124(1) U14(64);  
 /RXTIP5 R75(1) R114(1) U15(128);  
 /RXTIP6 R59(1) R98(1) U15(103);  
 /RXTIP7 R74(1) R100(1) U15(39);  
 /RXTIP8 R58(1) R118(1) U15(64);  
 /S3RAIS1~ RN17(2) U22(31);  
 /S3RAIS2~ RN17(12) U21(31);  
 /S3TAIS1~ RN17(3) U22(30);  
 /S3TAIS2~ RN17(13) U21(30);  
 /T1\_E1CLK I2(1) U8(120) U24(12);  
 /TBNC1N P8(2) R156(2) U22(1);  
 /TBNC1P P8(1) R156(1) U22(2);  
 /TBNC2N P6(2) R158(2) U21(1);  
 /TBNC2P P6(1) R158(1) U21(2);  
 /TFOUT1~ I16(1) U13(47);  
 /TOCTLCS~ RN16(1) U8(65) U17(60);  
 /TOOLREV0 P2(B12) RN2(1);  
 /TOOLREV1 P2(B13) RN2(2);  
 /TOOLREV2 P2(B14) RN2(3);  
 /TOOLREV3 P2(B15) RN2(4);  
 /TOOLTYP0 P2(B16) RN1(1);  
 /TOOLTYP1 P2(B17) RN1(2);  
 /TOOLTYP2 P2(B18) RN1(3);  
 /TOOLTYP3 P2(B19) RN1(4);

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| /TXRING1  | R103(1) U14(121);                       |
| /TXRING2  | R105(1) U14(110);                       |
| /TXRING3  | R107(1) U14(46);                        |
| /TXRING4  | R108(1) U14(57);                        |
| /TXRING5  | R97(1) U15(121);                        |
| /TXRING6  | R99(1) U15(110);                        |
| /TXRING7  | R101(1) U15(46);                        |
| /TXRING8  | R102(1) U15(57);                        |
| /TXTIP1   | C158(2) U14(118);                       |
| /TXTIP2   | C159(2) U14(113);                       |
| /TXTIP3   | C160(2) U14(49);                        |
| /TXTIP4   | C161(2) U14(54);                        |
| /TXTIP5   | C154(2) U15(118);                       |
| /TXTIP6   | C155(2) U15(113);                       |
| /TXTIP7   | C156(2) U15(49);                        |
| /TXTIP8   | C157(2) U15(54);                        |
| /VA17     | P2(A2) U17(20);                         |
| /VA18     | P2(A3) U17(19);                         |
| /VA19     | P2(A4) U17(12);                         |
| /VA20     | P2(A5) U17(11);                         |
| /VA21     | P2(A6) U8(64);                          |
| /VA22     | P2(A7) U8(63);                          |
| /VA23     | P2(A8) U8(62) U14(35) U15(35);          |
| /VA24     | P2(A9) U8(61) U14(34) U15(34) U31(9);   |
| /VA25     | P2(A10) U8(60) U14(33) U15(33) U31(8);  |
| /VA26     | P2(A11) U8(59) U14(32) U15(32) U31(7);  |
| /VA27     | P2(A12) U8(58) U14(31) U15(31) U31(6);  |
| /VA28     | P2(A13) U8(57) U14(30) U15(30) U31(5);  |
| /VA29     | P2(A14) U8(56) U14(29) U15(29) U31(4);  |
| /VA30     | P2(A15) U8(55) U14(28) U15(28) U31(3);  |
| /VA31     | P2(A16) U8(54) U14(27) U15(27) U31(2);  |
| /VD0      | P2(C14) U8(48) U14(26) U15(26) U18(11); |
| /VD1      | P2(C15) U8(47) U14(25) U15(25) U18(12); |
| /VD2      | P2(C16) U8(46) U14(24) U15(24) U18(13); |
| /VD3      | P2(C17) U8(45) U14(17) U15(17) U18(14); |
| /VD4      | P2(C18) U8(44) U14(16) U15(16) U18(15); |
| /VD5      | P2(C19) U8(43) U14(15) U15(15) U18(16); |
| /VD6      | P2(C20) U8(42) U14(14) U15(14) U18(17); |
| /VD7      | P2(C21) U8(41) U14(13) U15(13) U18(18); |
| /VDS3EN1~ | P1(A7) RN16(10) U17(95);                |
| /VDS3EN2~ | P1(B28) RN16(9) U17(96);                |
| /VMF2     | R35(2) R43(1) U1(8);                    |
| /VMF3     | R34(2) R35(1) U1(4);                    |
| /VRCLK2   | RN8(5) U7(18);                          |
| /VRCLK4   | RN10(5) U27(18);                        |
| /VRCLK5   | R18(2) U4(18);                          |
| /VRCLK7   | RN9(5) U25(18);                         |
| /VRSYNC2  | RN8(6) U7(17);                          |
| /VRSYNC6  | RN11(5) U3(17);                         |
| /VRXD2    | RN8(7) U7(16);                          |
| /VRXD6    | RN11(6) U3(16);                         |
| /VRXD7    | RN9(6) U25(16);                         |
| /VTCLK1   | R21(2) U26(15);                         |
| /VTCLK2   | RN8(8) U7(15);                          |

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| /VTCLK4  | RN10(8) U27(15);                                |
| /VTCLK5  | R22(1) U4(15);                                  |
| /VTCLK7  | RN9(7) U25(15);                                 |
| /VTSYNC2 | R38(2) U7(14);                                  |
| /VTSYNC6 | RN11(8) U3(14);                                 |
| /WE0~    | P2(D4) RT1(1) U17(68);                          |
| /WE1~    | P2(D5) RT2(2) U17(63);                          |
| /XSIG745 | C59(1) C60(1) C61(1) L4(2) L6(2) L11(1) U2(24); |
| /XSIG763 | C65(1) C66(1) C67(1) L1(2) L3(2) L8(1) U1(24);  |