



**Freescale Semiconductor, Inc.**

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**Freescale Semiconductor, Inc.**

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

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**For More Information On This Product,  
Go to: [www.freescale.com](http://www.freescale.com)**

## 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)

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## 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.

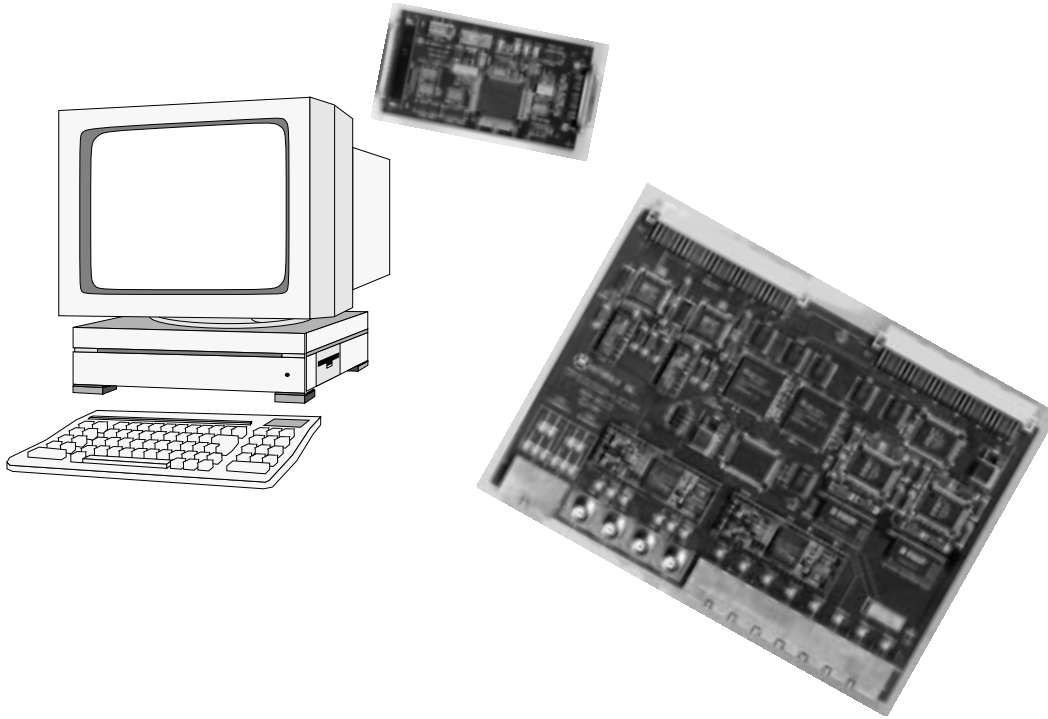
## 1•7 REQUIRED EQUIPMENT

The MPC8260TCOM operates only with the MPC8260ADS.

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

- 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.**



## 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 1 A1	T1 2 B1	T1 3 C1	T1 4 D1	T1 5 A2	T1 6 B2	T1 7 C2	T1 8 D2	ADS ATM8	FE 1 FCC1	ADS FE 0 FCC2	FE 2 FCC3	TDM1 DS3 1 FCC2	TDM2 DS3 2 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 1 A1	T1 2 B1	T1 3 C1	T1 4 D1	T1 5 A2	T1 6 B2	T1 7 C2	T1 8 D2	ADS ATM8	FE 1 FCC1	ADS FE 0 FCC2	FE 2 FCC3	TDM1 DS3 1 FCC2	TDM2 DS3 2 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.

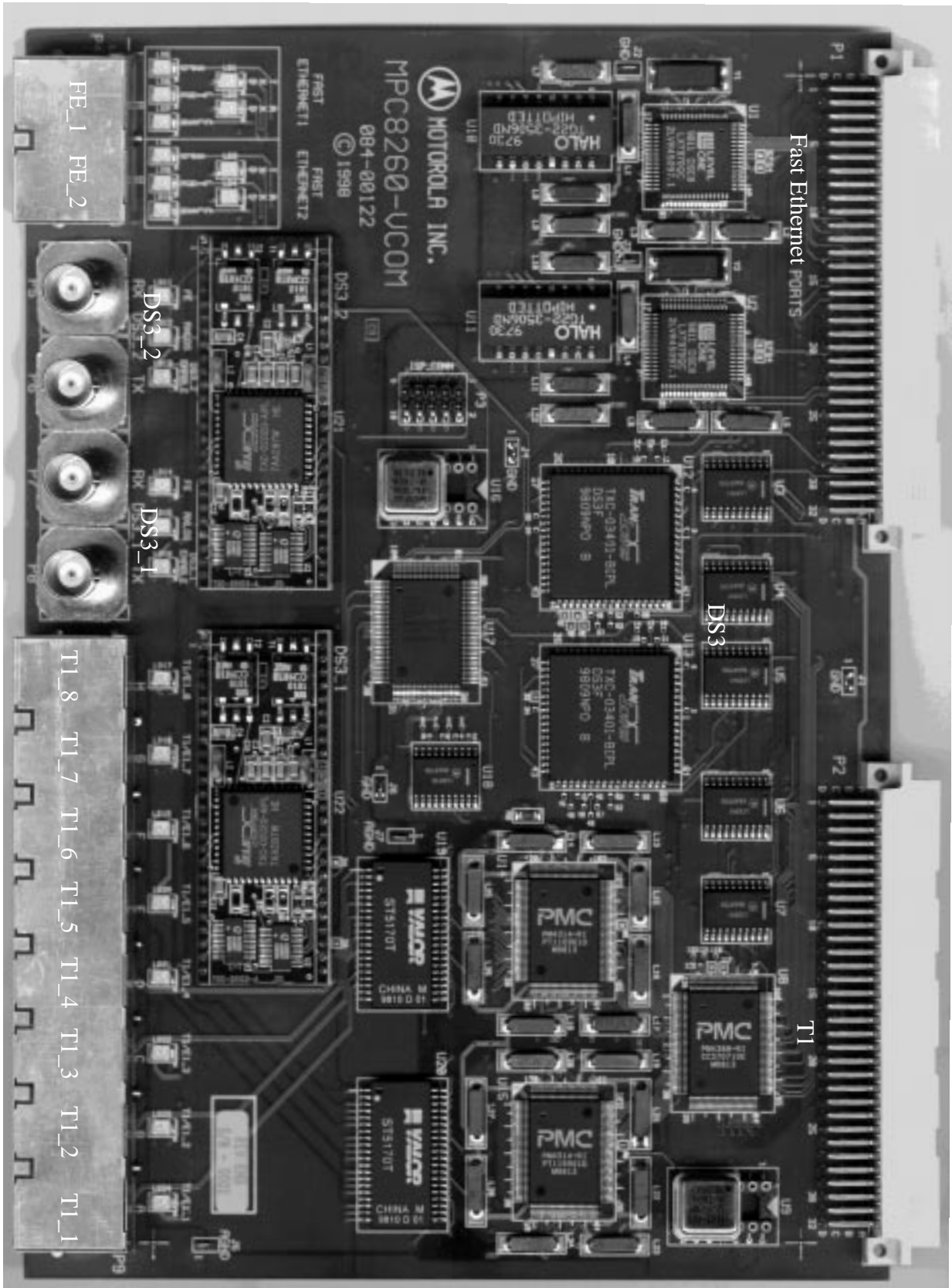
**2•2•23 T1/E1 2 ENABLE. LD23**

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.

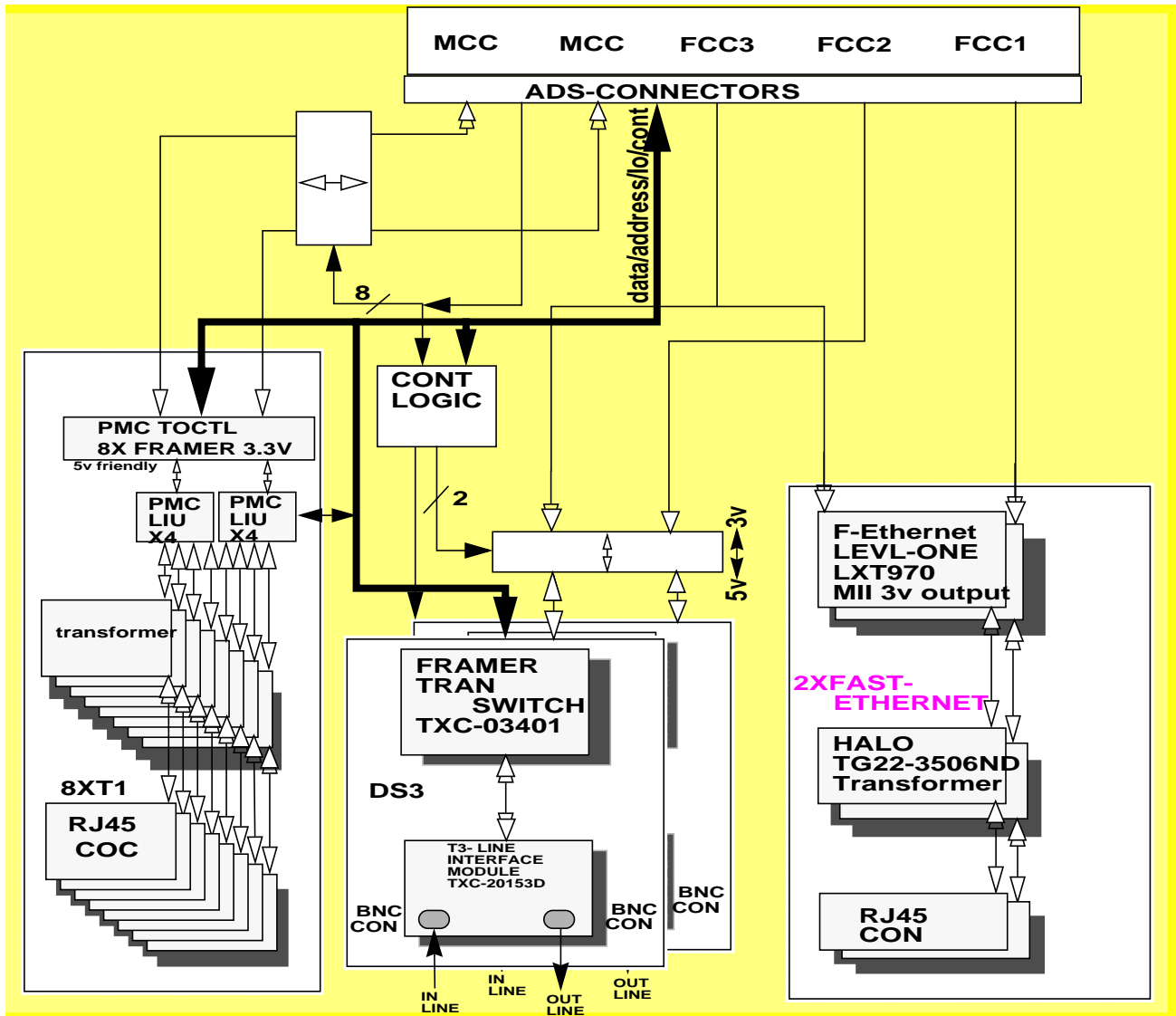
### 3•2 GENERAL DESCRIPTION

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.

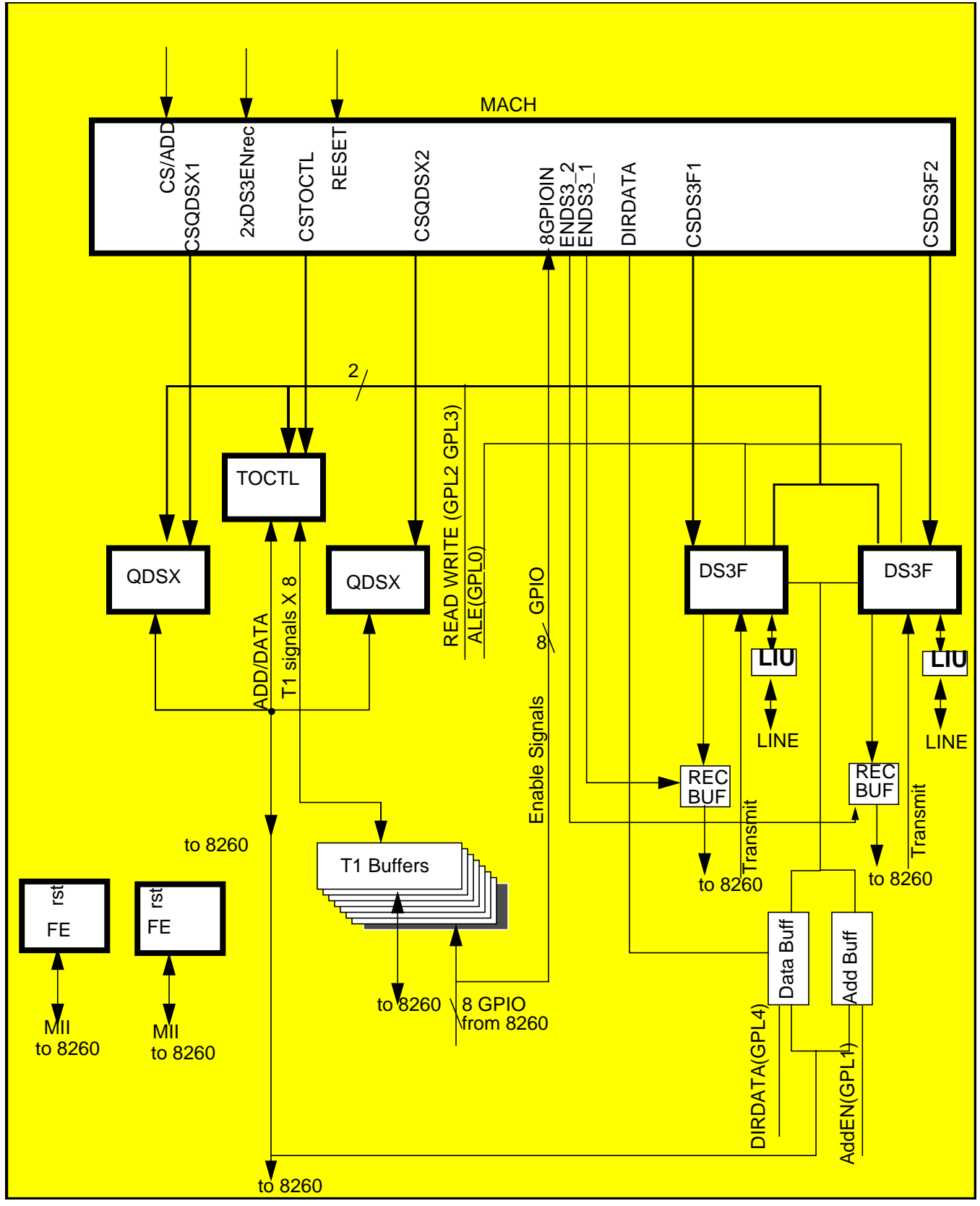
The following paragraphs will show the TCOM block diagram and describe each one of the board parts.

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



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### 3-3 CONTROL LOGIC BLOCK



### 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 PA1 = 0												EN			
PA5 = 1 PA1 = 0													EN		
PC13 = 0 PA1 = 0														EN	
PC13 = 1 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, BCTLO, 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

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.

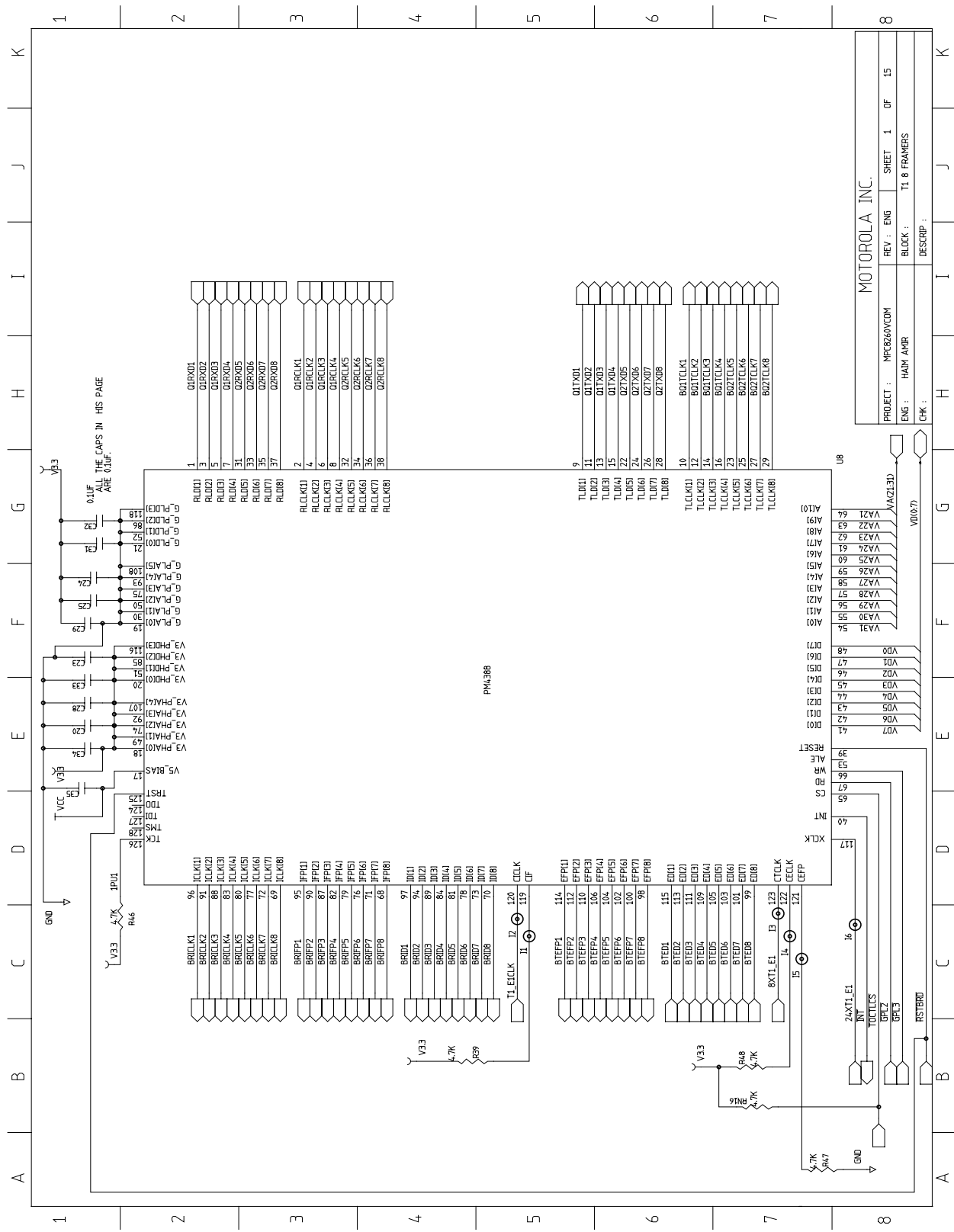
PC9 and PC10 are the MII MDIO and MDC signals; these signals are common to the 3 FE modules - the one on the ADS and the two on the TCOM.

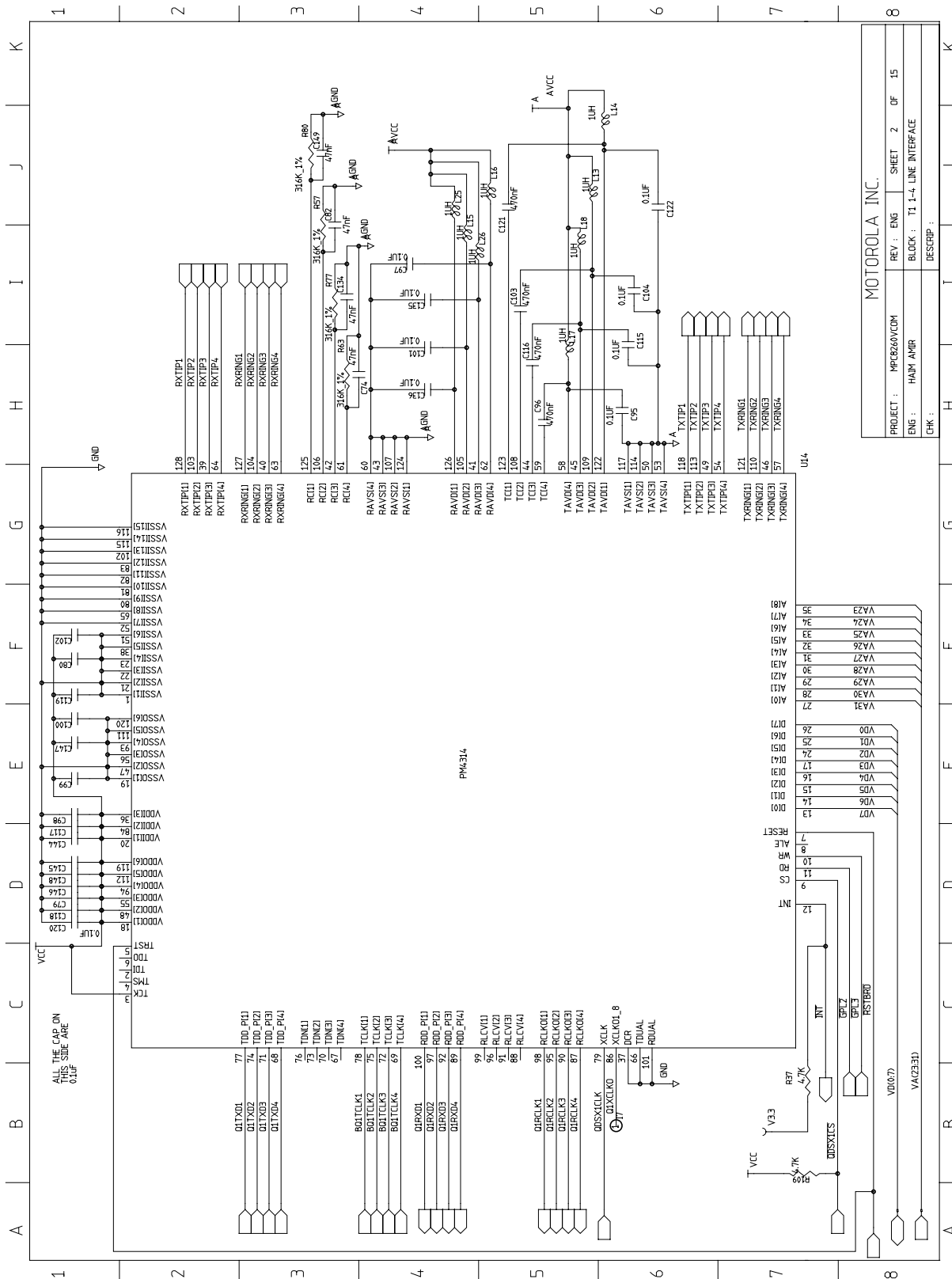
**Table 4: Ports Function Signals**

Ports	T1 1 A1	T1 2 B1	T1 3 C1	T1 4 D1	T1 5 A2	T1 6 B2	T1 7 C2	T1 8 D2	ADS ATM8	FE 1 FCC1	ADS FE 0 FCC2	FE 2 FCC3	TDM1 DS3 1 FCC2	TDM2 DS3 2 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	

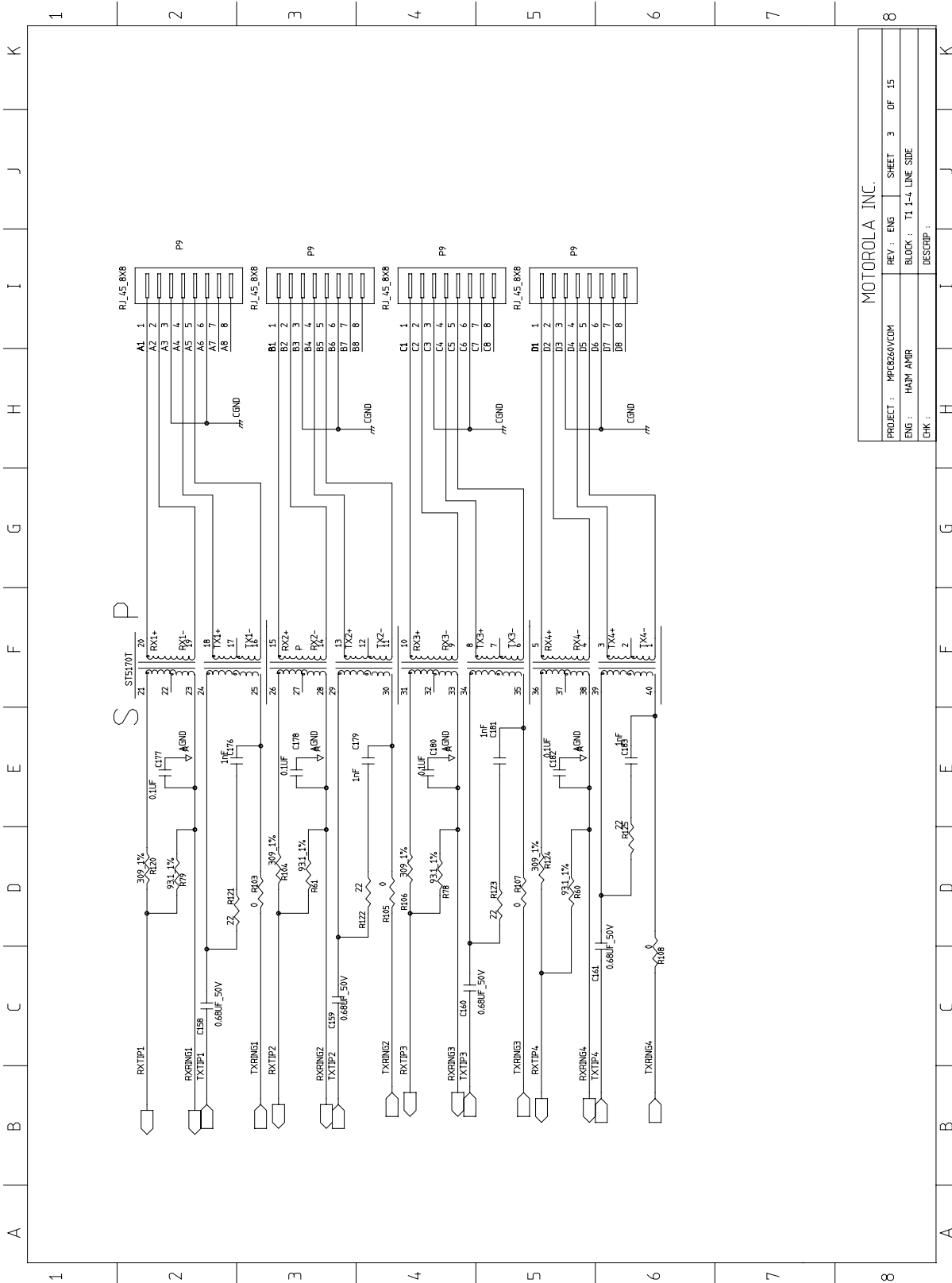
Table 4: Ports Function Signals

Ports	T1 1 A1	T1 2 B1	T1 3 C1	T1 4 D1	T1 5 A2	T1 6 B2	T1 7 C2	T1 8 D2	ADS ATM8	FE 1 FCC1	ADS FE 0 FCC2	FE 2 FCC3	TDM1 DS3 1 FCC2	TDM2 DS3 2 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)														
PC21 (clock11)														
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												

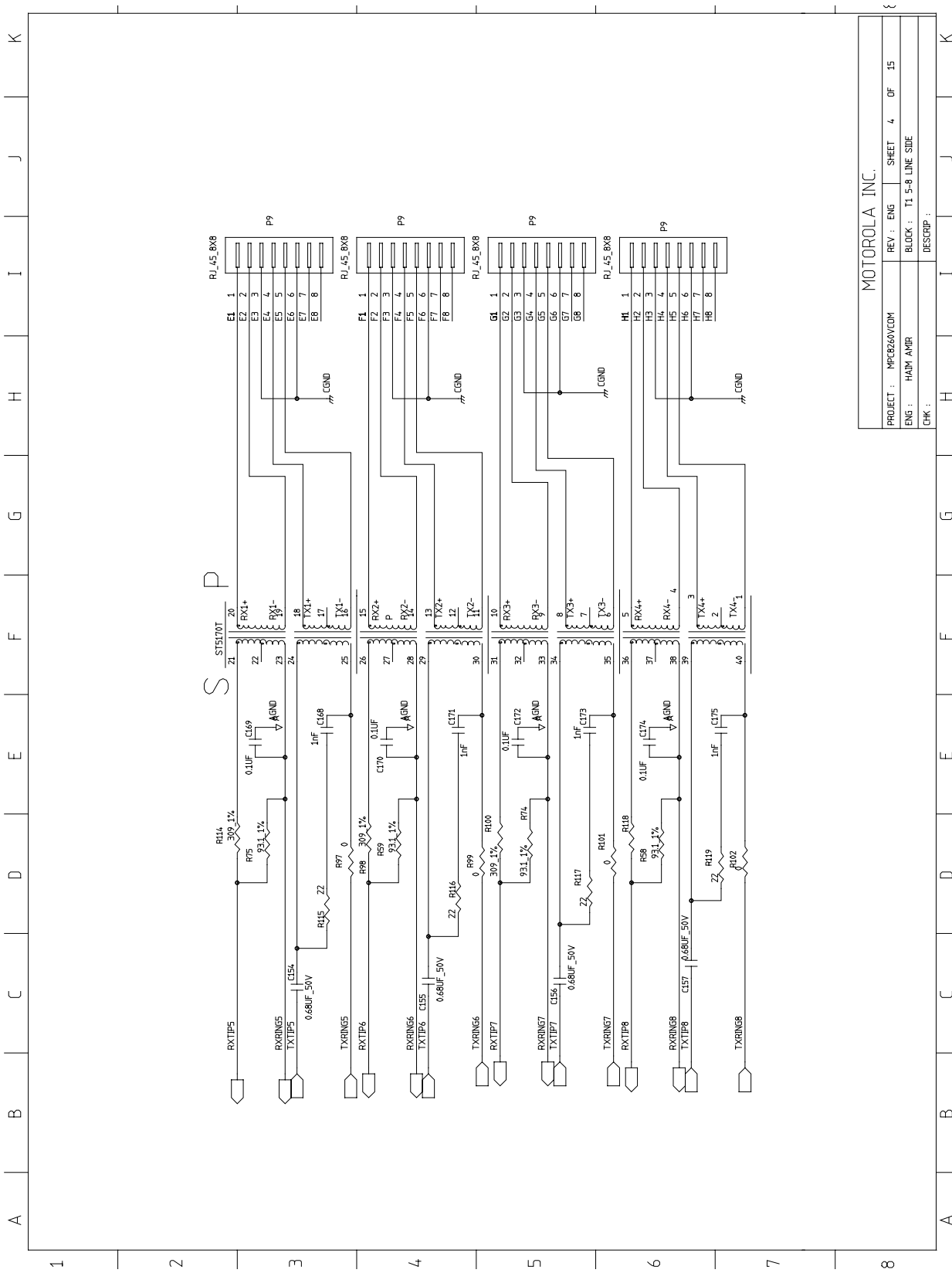




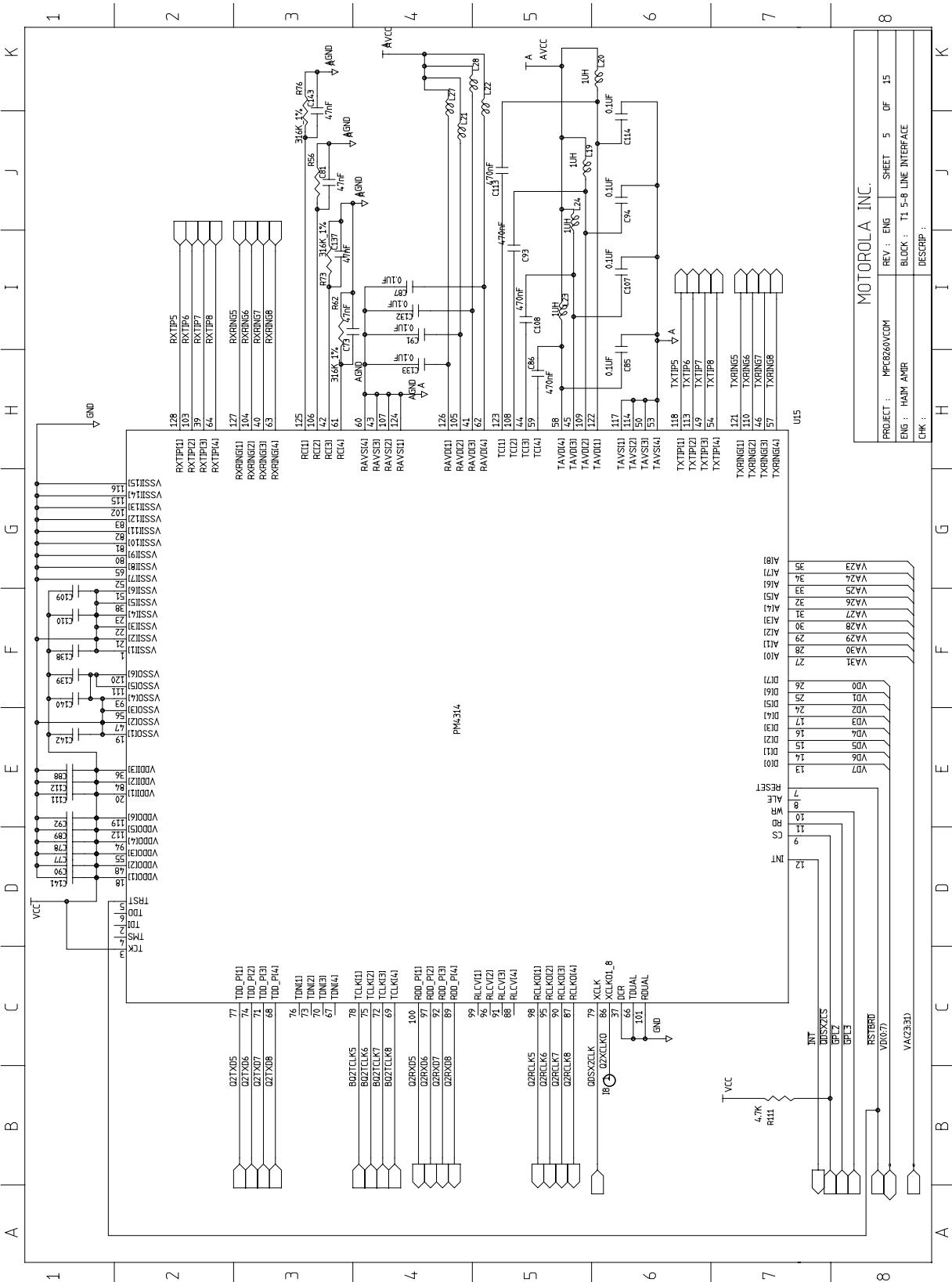
MOTOROLA INC.			
PROJECT :	MPC8260TCOM	REV :	ENG
ENG :	HAIK AMR	BLOCK :	T1 1-4 LINE INTERFACE
CHK :		DESCRIP :	
SHEET	2	OF	15



MOTOROLA INC.			
PROJECT : MPC566VCOM	REV : ENG	SHEET 3	DF 15
ENG : HARM AMIR	BLOCK : T1 1-4 LINE SIDE		
CHK :	DESCRP :		

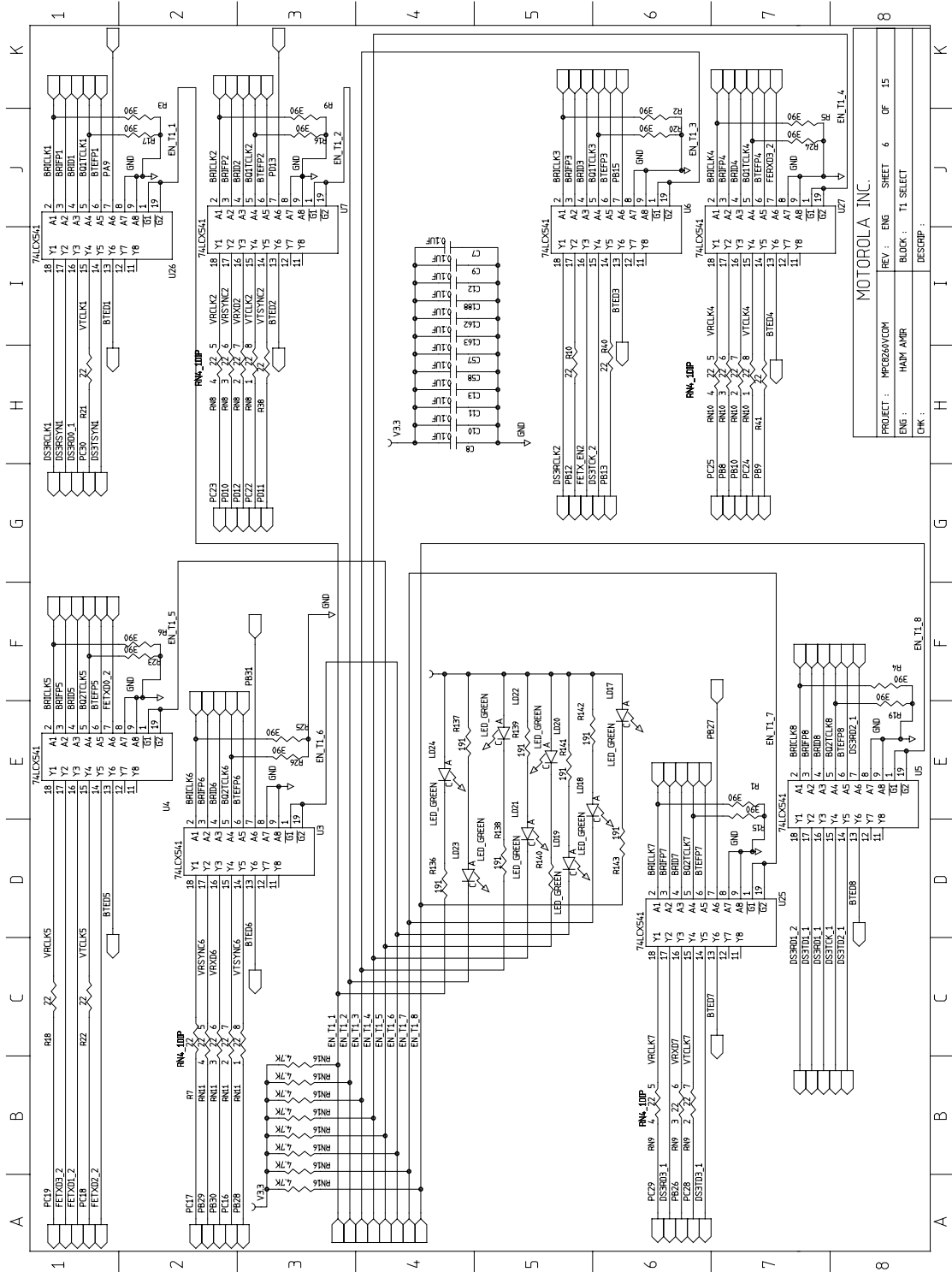


MOTOROLA INC.			
PROJECT : MPC8260VCOM	REV : ENG	SHEET 4	OF 15
ENG : HARM AMR	BLOCK : T1 5-8 LINE SIDE		
CHK :	DESCRIP :		

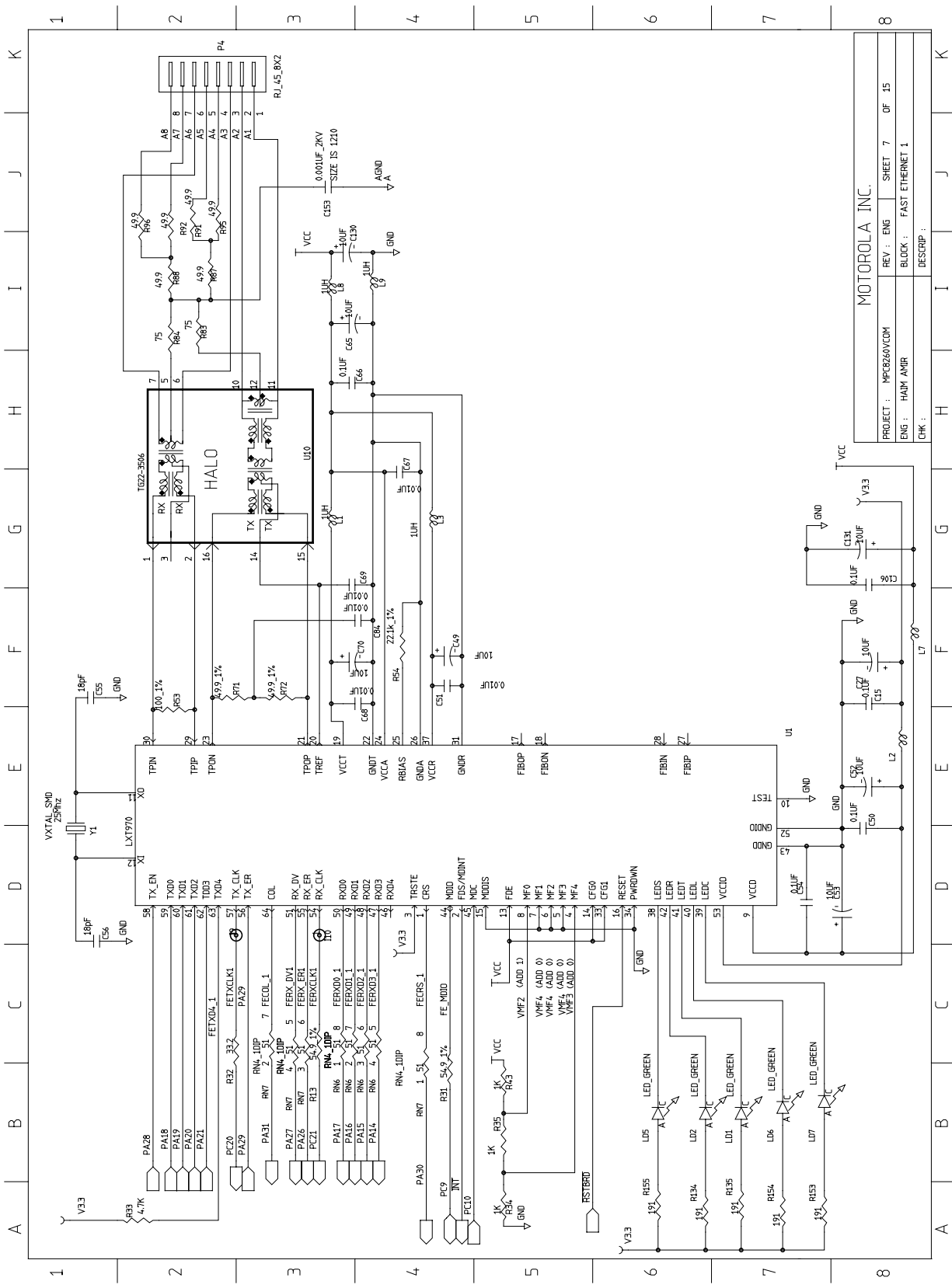


MOTOROLA INC.			
PROJECT :	MPC626VCDM	REV :	ENG
ENG :	HARM AMR	BLOCK :	T1 5-8 LINE INTERFACE
CHK :		DESCRIP :	
		SHEET :	5 OF 15

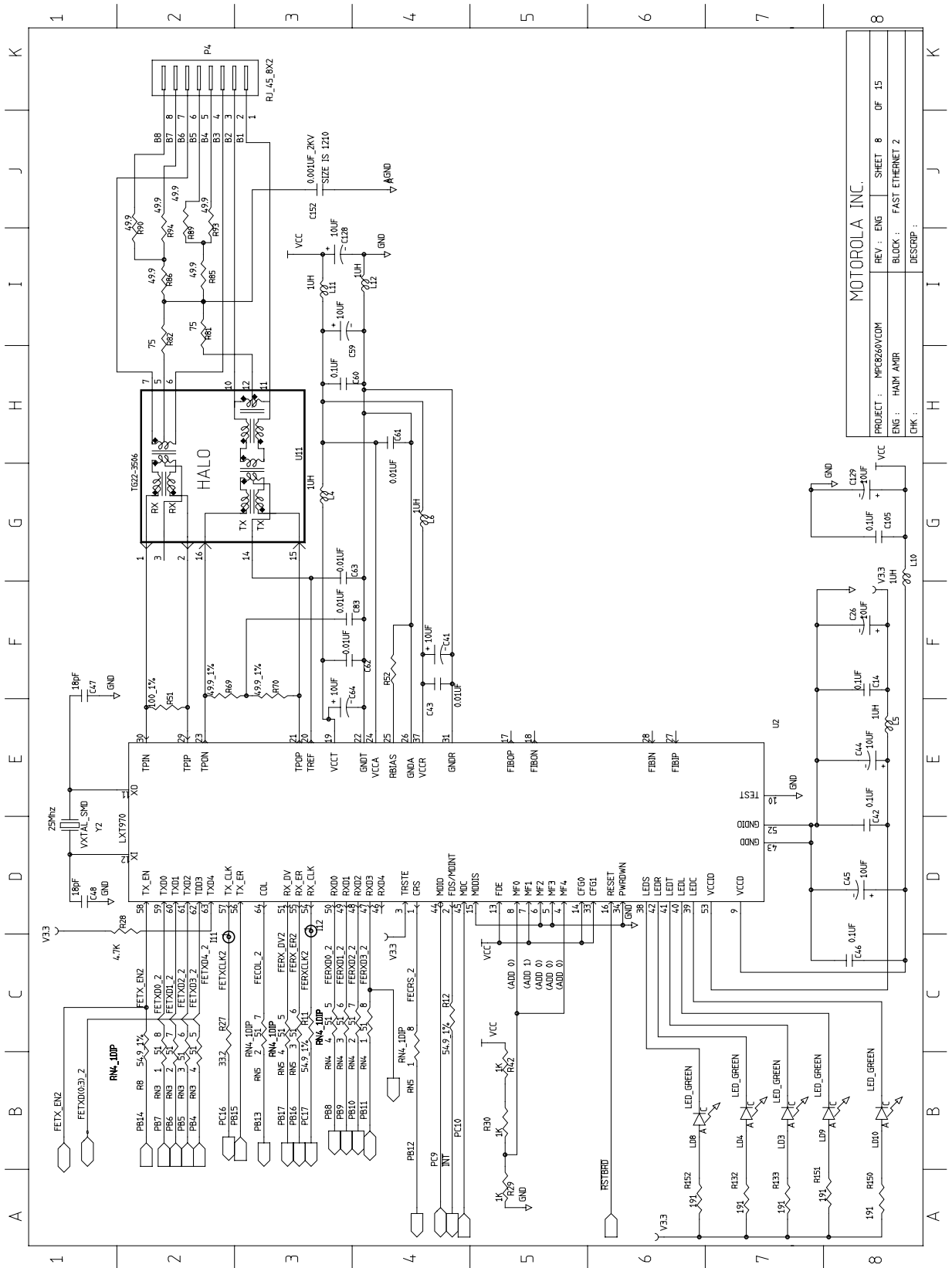




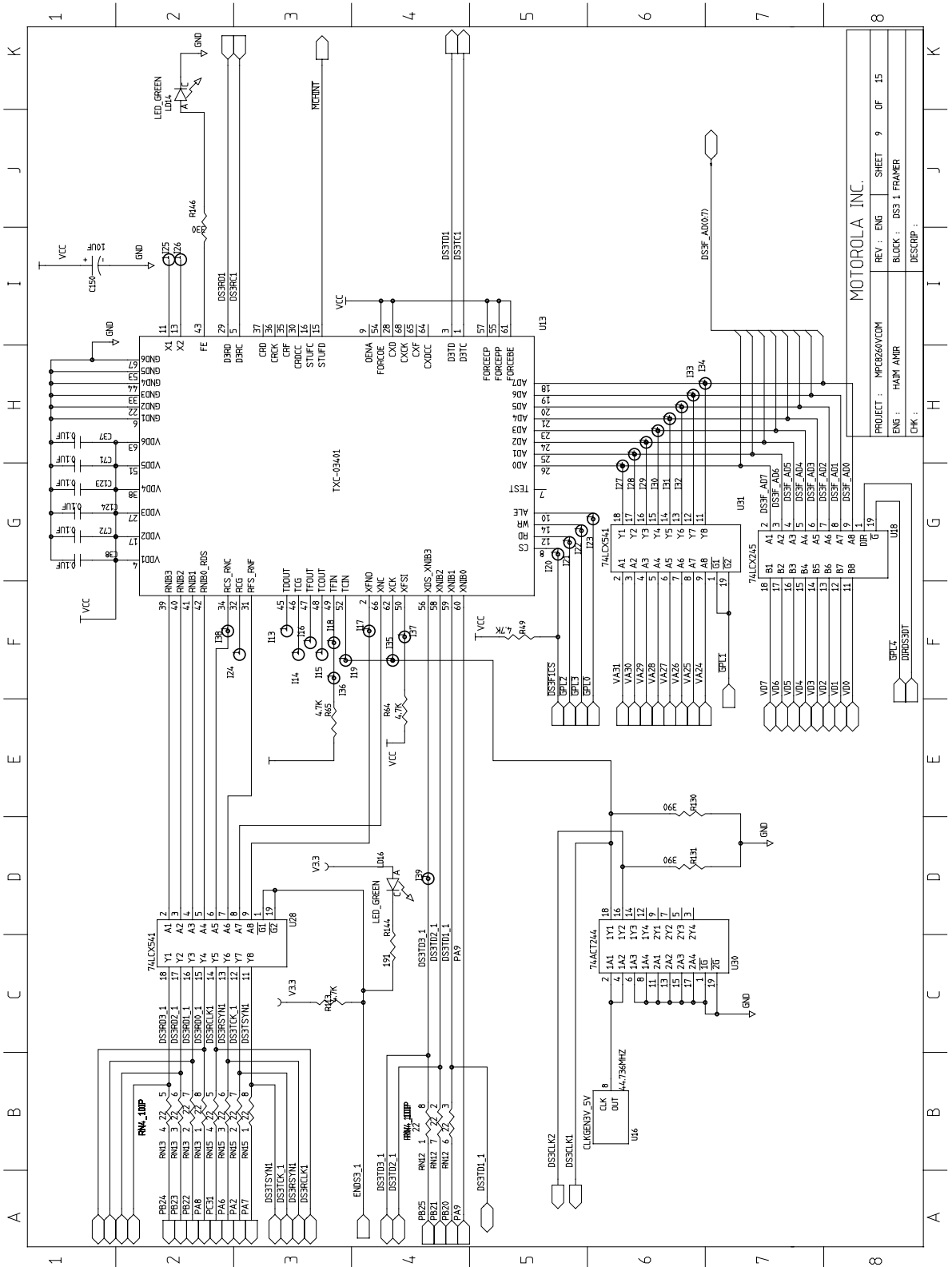
PROJECT :	MPC8260TCOM	REV :	ENG	SHEET	6	OF	15
ENG :	HAM AMR	BLOCK :	T1 SELECT	CHK :		DESCRIP :	
MOTOROLA INC.							



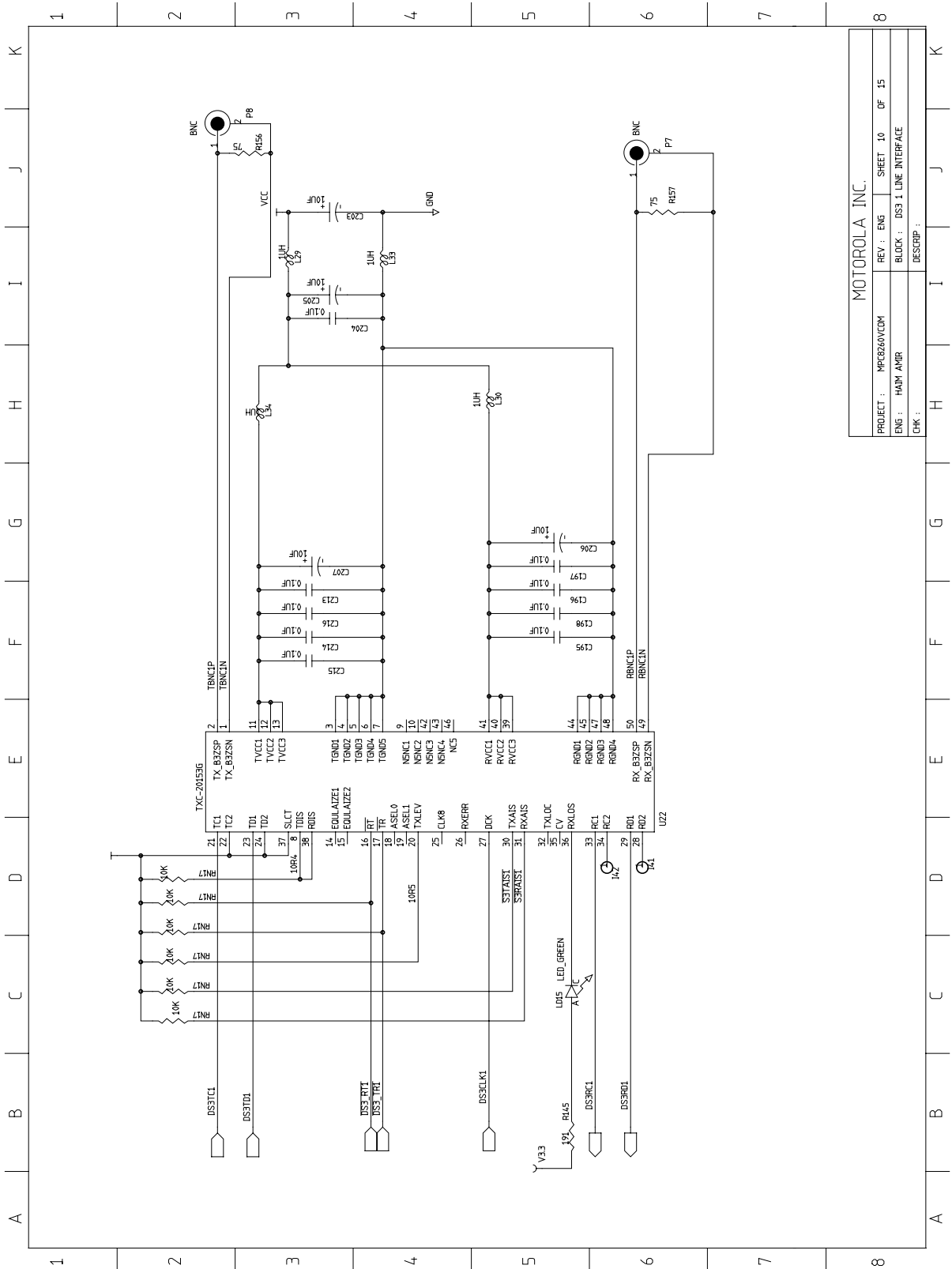
MOTOROLA INC.			
PROJECT :	MFE26VCOM	SHEET :	7 OF 15
ENG :	HAIM AMIR	BLOCK :	FAST ETHERNET 1
CHK :		DESCRIP :	



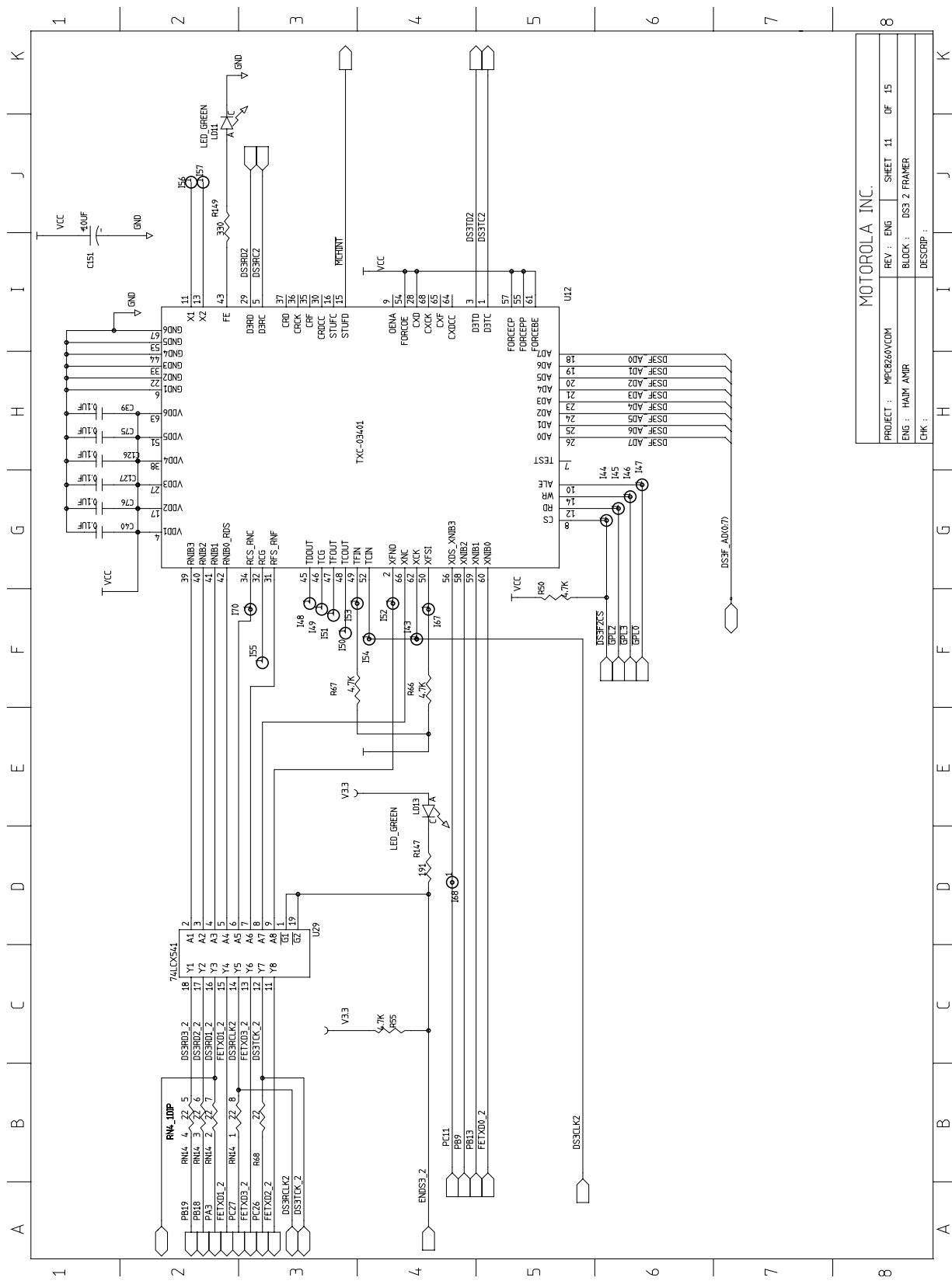
PROJECT :	MPC8260TCOM
ENG :	HAWM AMR
CHK :	
REV :	ENG
SHEET :	8
OF :	15
BLOCK :	FAST ETHERNET 2
DESCRIP :	

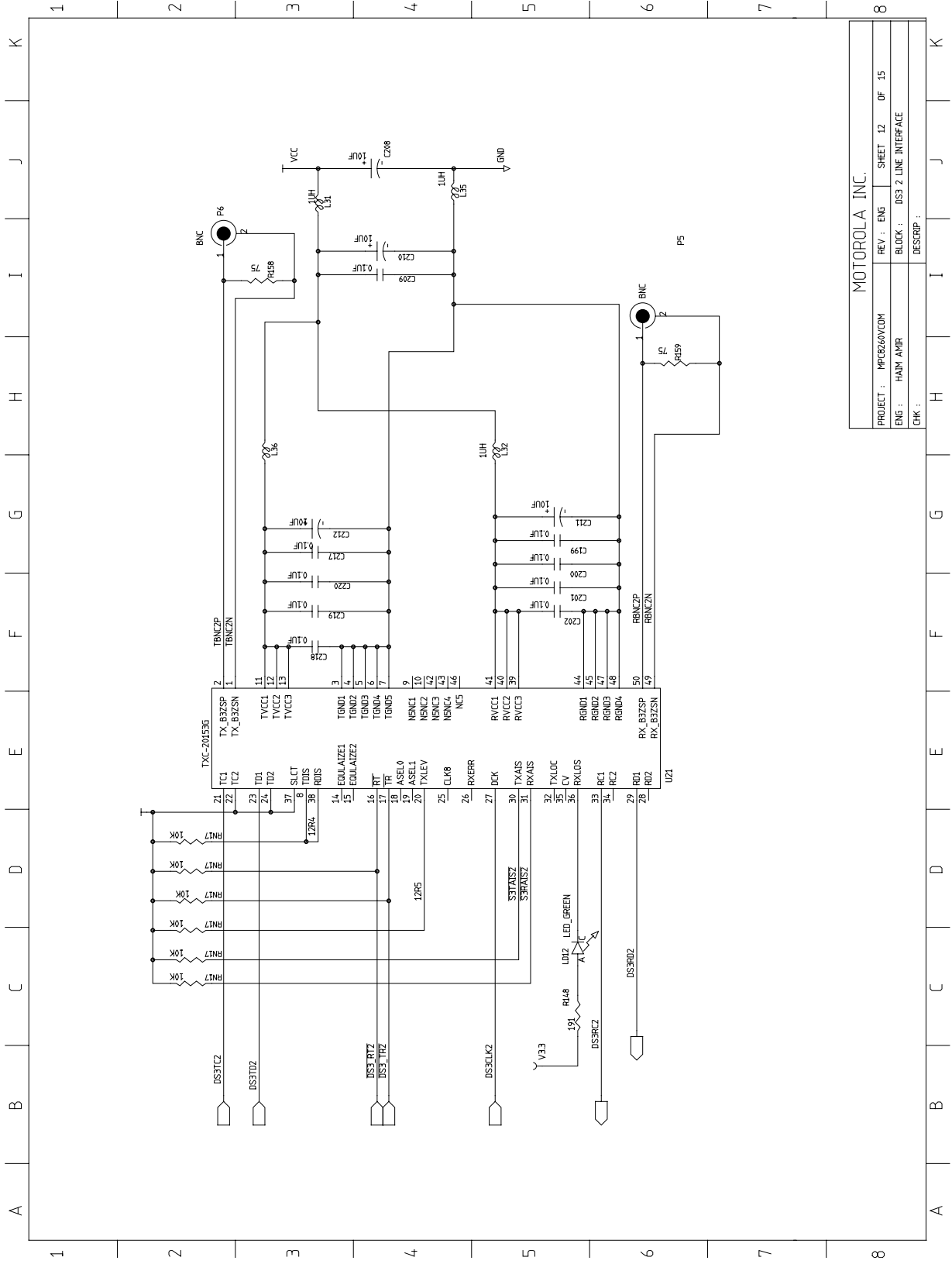


MOTOROLA INC.  
REV : ENG SHEET 9 OF 15  
PROJECT : MPC8246VCOM  
ENG : HANY AMR  
BLOCK : DS3 1 FRAMER  
CHK :  
DESCRIP :

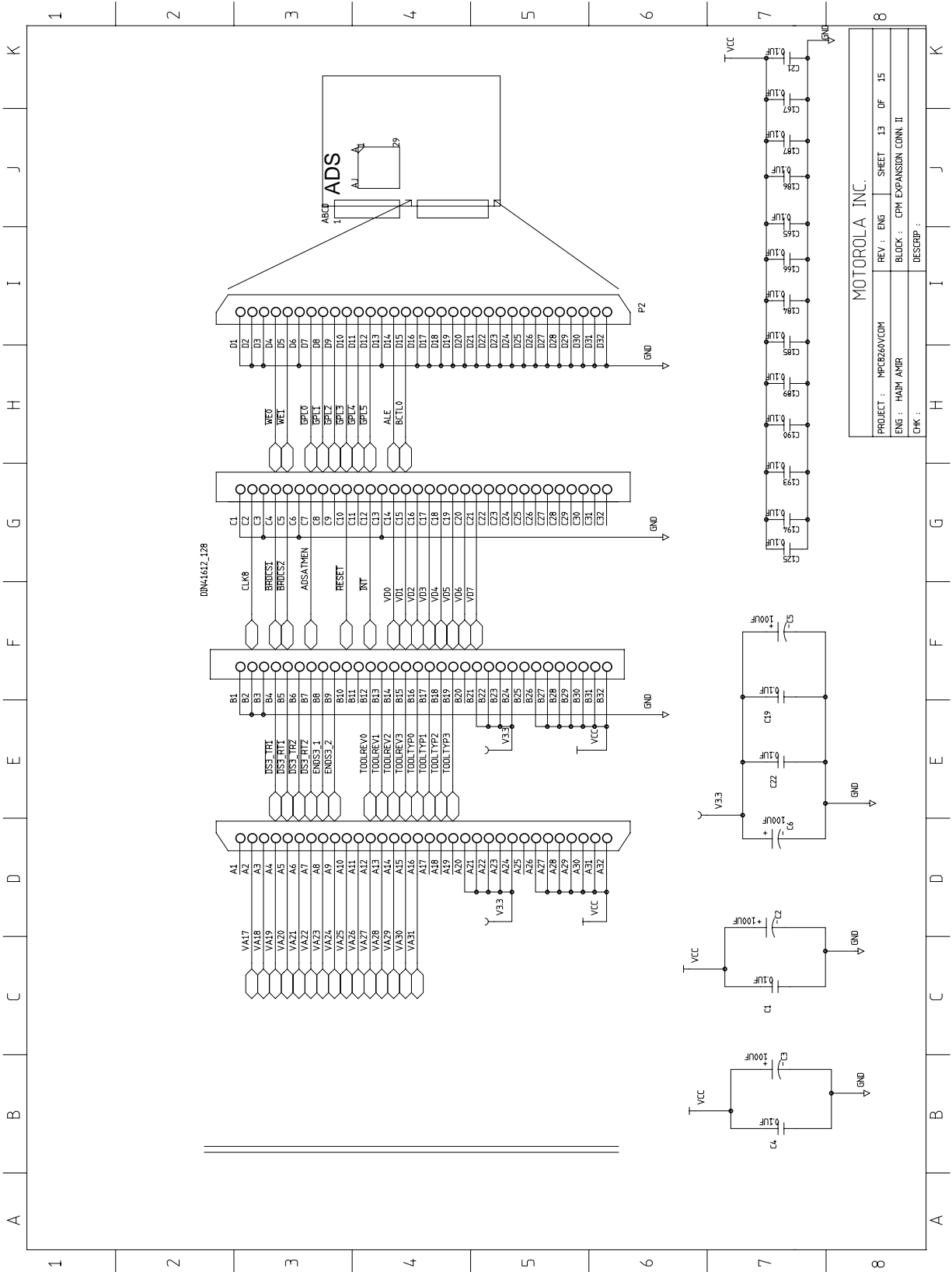


MOTOROLA INC.			
PROJECT :	MPC8260TCOM	REV :	ENG
ENG :	HAIM AMR	SHEET :	10 OF 15
CHK :		BLOCK :	DS3 1 LINE INTERFACE
		DESCRIP :	



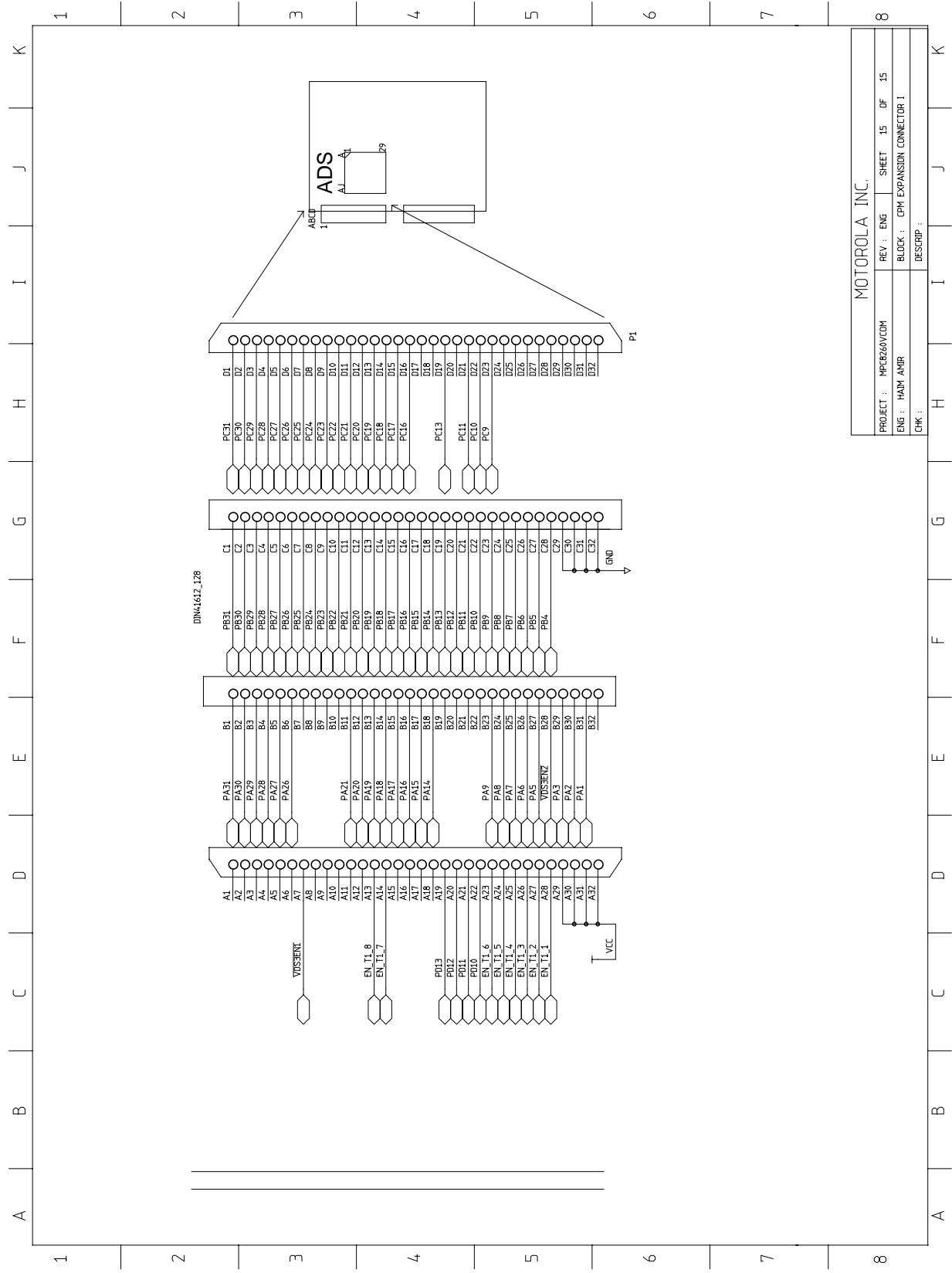


MOTOROLA INC.			
PROJECT :	MPC8260TCOM	REV :	ENG
ENG :	HAIM AMR	BLOCK :	DSS 2 LINE INTERFACE
CHK :		DESCRIP :	









## 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 TDMB1-L1RSYNC	T1_2 RSYNC; this function use TDMB1
A23	PD9 EN_T1_6	Enable T1_6 signal. If this signal is low then T1_6 is enabled
A24	PD8 EN_T1_5	Enable T1_5; if this signal is low T1_5 is enable and DS3_2 is disabled
A25	PD7 EN_T1_4	Enable T1_4; if this signal is low T1_4 is enable and DS3_2 is disabled
A26	PD6 EN_T1_3	Enable T1_3; if this signal is low T1_3 is enable and DS3_2 is disabled
A27	PD5 EN_T1_2	Enable T1_2 signal. If this signal is low then T1_2 is enabled
A28	PD4 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 MIICOL/ATM8-TxEnb	Fast Ethernet FCC1 MIICOL signal or ATM8 on ADS TxEnb signal.
B2	PA30 MIICRS/ATM8-TxClav	Fast Ethernet FCC1 MIICRS signal or ATM8 on ADS TxClav signal
B3	PA29 MIITXER/ATM8-TxSOC	Fast Ethernet FCC1 MIITXER signal or ATM8 on ADS Txsoc signal
B4	PA28 MIITXEN/ATM8-RxEnb	Fast Ethernet FCC1 MIITXEN signal or ATM8 on ADS RxEnb signal
B5	PA27 MIIRXDV/ATM8-RxSOC	Fast Ethernet FCC1 MIIRXDV signal or ATM8 on ADS RxSoc signal
B6	PA26 MIIRXER/ATM8-RxClav	Fast Ethernet FCC1 MIIRxClav signal or ATM8 on ADS RxClav signal
B7	NC	
B8	NC	
B9	NC	
B10	NC	
B11	PA21 MIITXD3/ATM8-TXD4	Fast Ethernet FCC1 MIITXD3 signal or ATM8 on ADS TXD4 signal
B12	PA20 MIITXD2/ATM8-TXD5	Fast Ethernet FCC1 MIITXD2 signal or ATM8 on ADS TXD5 signal
B13	PA19 MIITXD1/ATM8-TXD6	Fast Ethernet FCC1 MIITXD1 signal or ATM8 on ADS TXD6 signal
B14	PA18 MIITXD0/ATM8-TXD7	Fast Ethernet FCC1 MIITXD0 signal or ATM8 on ADS TXD7 signal
B15	PA17 MIIRXD0/ATM8-RXD7	Fast Ethernet FCC1 MIIRXD0 signal or ATM8 on ADS RXD7 signal
B16	PA16 MIIRXD1/ATM8-RXD6	Fast Ethernet FCC1 MIIRXD1 signal or ATM8 on ADS RXD6 signal
B17	PA15 MIIRXD2/ATM8-RXD5	Fast Ethernet FCC1 MIIRXD2 signal or ATM8 on ADS RXD5 signal
B18	PA14 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 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 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 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 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. DS3_1 RT will be low if PA5 and PA1 will be low. 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 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 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 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 TDMB2-L1TXD/ <i>MIITXER</i>	T1_6 TXD signal or FCC2 MIITXER signal on ADS.
C2	PB30 TDMB2-L1RXD/ <i>ATM8-MIIRXDV</i>	T1_6 RXD signal or FCC2 MIIRXDV signal on ADS.
C3	PB29 TDMB2-L1RSYNC/ <i>MIITXEN</i>	T1_6 RSYNC signal or FCC2 MIITXEN signal on ADS.
C4	PB28 TDMB2-L1TSYNC/ <i>MIIRXER</i>	T1_6 TSYNC signal or FCC2 MIIRXER signal on ADS.
C5	PB27 TDMC2-L1TXD/ <i>MIICOL</i>	T1_7 TXD signal or FCC2 MIICOL signal on ADS.
C6	PB26 TDMC2-L1RXD/ <i>MIICRS</i>	T1_7 RXD signal or FCC2 MIICRS signal on ADS.
C7	PB25 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 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 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 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 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 DS3-RXD3/ <i>MIIRXD2</i>	DS3_1 RXD3 signal on FCC3 or MIIRXD2 signal on FCC2 on ADS.
C14	PB18 DS3-RXD2/ <i>MIIRXD3</i>	DS3_1 RXD2 signal on FCC3 or MIIRXD3 signal on FCC2 on ADS.
C15	PB17 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	
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 MIITXCLK(clock12)/ <i>ATM8-TxCk</i>	FE_1 MIITXCLK signal on FCC1 or ATM8 TxClk signal on ADS.
D13	PC19 TDMA2-/RXCLK(clock13)/ <i>MIIRXCLK</i>	T1_5 RXCLK signal or FE_0 MIIRXCLK signal on ADS.
D14	PC18 TDMA2-TXCLK(clock14)/ <i>MIITXCLK</i>	T1_5 TXCLK signal or FE_0 MIITXCLK signal on ADS.
D15	PC17 MIIRXCLK(clock15)/TDMB2-RXCLK	T1_6 RXCLK signal or FE_2 MIIRXCLK signal on FCC3
D16	PC16 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. DS3_2 RT will be low if PC13 and PA1 will be low. DS3_2 TR will be low if PC13 will be high and PA1 will be low.
D20	NC	
D21	DS3-TXD3 PC11	DS3_2 TXD3 signal on FCC3
D22	MIIMDC 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 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). PM4314 QDSX (T1_1 - T1_4 LIU) CS signal uses !A20 & !A19 & A18 & !BRDCS1 (CS6), PM4314 QDSX (T1_5 - T1_8 LIU) CS signal uses !A20 & A19 & !A18 & !BRDCS1 (CS6), TXC-03401 DS3F ( DS3_1) CS signal uses !A20 & A19 & A18 & !BRDCS1 (CS6). TXC-03401 DS3F (DS3_2) CS signal uses A20 & !A19 & !A18 & !BRDCS1 (CS6).
A4	VA19	
A5	VA20	
A6	VA21	
A6	VA21	A21 is the MSB of the TOCTL device address bus. (PM4388).
A7	VA22	A22 is one of the address bus signals of the TOCTL (PM4388).
A8	VA23	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	

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

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**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	

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**Table 5-1 MPC8260TCOM Parts List**

**Table 6:**

DESCRIPTION	QUANTITY	MANUFACTURER PART NUMBER	MANUFACTURER	MOT. PART NUMBER	LOCATION
100NF 16V 10% X7R 0603 SMD	134	B37931K9104K60	SIEMENS	021-00118	C1 C4 C7 C8 C9 C10 C11 C12 C13 C14 C15 C19 C20 C21 C22 C23 C24 C25 C28 C29 C31 C32 C33 C34 C35 C37 C38 C39 C40 C42 C46 C50 C54 C57 C58 C60 C66 C71 C72 C75 C76 C77 C78 C79 C80 C85 C87 C88 C89 C90 C91 C92 C94 C95 C97 C98 C99 C100 C101 C102 C104 C105 C106 C107 C109 C110 C111 C112 C114 C115 C117 C118 C119 C120 C122 C123 C124 C125 C126 C127 C132 C133 C135 C136 C138 C139 C140 C141 C142 C144 C145 C146 C147 C148 C162 C163 C165 C166 C167 C169 C170 C172 C174 C177 C178 C180 C182 C184 C185 C186 C187 C188 C189 C190 C193 C194 C195 C196 C197 C198 C199 C200 C201 C202 C204 C209 C213 C214 C215 C216 C217 C218 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	17	1206 5C 103K ATJ	AVX	021-00070	C17 C18 C30 C36 C43 C51 C61 C62 C63 C67 C68 C69 C83 C84 C164 C191 C192
10UF 25v 10% C TNT SMD	26	B45196-H5106-K309	SIEMENS	023-00027	C26 C27 C41 C44 C45 C49 C52 C53 C59 C64 C65 C70 C128 C129 C130 C131 C150 C151 C203 C205 C206 C207 C208 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 C143 C149
0.47UF 50V 1812 SMD	8.	1812 5C 474K ATJ	AVX	021-00113	C86 C93 C96 C103 C108 C113 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 C159 C160 C161
1000P (1nF) 50V 10% 1206	8.	AVX12065C102KA	AVX	021-00105	C168,C171,C173,C175 C176,C179,C181,C183.

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**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

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**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
TRANSFORMETR 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 INTRFACE PM431	2	PM4314-RI	PMC SIERA	051-PM4314-RI	U14 U15
44.736MHz 5V 8P CRYSC	1	MH16FDD		048-00105	U16

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**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);



/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);

/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);

/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);



/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);