



MatchPort®

MatchPort NR Integration Guide

Part Number 900-573
Revision A May 2010

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Disclaimer and Revisions

Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Note: *This product has been designed to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause harmful interference to radio communications.*

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

Note: *With the purchase of MatchPort NR, the OEM agrees to an OEM firmware license agreement that grants the OEM a non-exclusive, royalty-free firmware license to use and distribute the binary firmware image provided, only to the extent necessary to use the MatchPort NR hardware. For further details, please see the MatchPort NR OEM firmware license agreement.*

Date	Rev.	Comments
May 2010	A	Initial Draft

For the latest revision of this product document, please check our online documentation at www.lantronix.com/support/documentation.

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1: Introduction

About the Integration Guide

This guide provides the information needed to integrate the MatchPort NR device server within another product. The intended audiences are the engineers responsible for integrating the MatchPort NR into their product.

Additional Documentation

Visit the Lantronix Web site at www.lantronix.com/support/documentation for the following additional documentation.

<i>MatchPort Demonstration Kit Quick Start Guide</i>	Briefly explains the basics to get the MatchPort NR up and running.
<i>MatchPort User Guide</i>	Provides information needed to configure, use, and update the MatchPort NR firmware.
<i>How to Connect a Lantronix Embedded Module to a Wired Ethernet Port</i>	Provides information and details for module layout. (www.lantronix.com/resources/appnotes)

2: Description and Specifications

The MatchPort NR embedded device server is a complete network-enabling solution. MatchPort NR allows Original Equipment Manufacturers (OEMs) to add connectivity to their products by incorporating it onto a circuit board with minimal engineering.

The MatchPort NR functions independently of a PC, providing an integrated solution that combines a processor, memory, a 10/100 Mbps Ethernet transceiver, and two high-speed serial ports into a single compact module. It includes an operating system, an embedded Web server, and a full TCP/IP protocol stack. In addition, the MatchPort NR sends email alerts and supports numerous other network communication protocols, including ARP, UDP, TCP, ICMP, Telnet, AutoIP, DHCP, HTTP and SNMP.

MatchPort NR Overview

The MatchPort NR contains Lantronix's own DSTni controller with 256 Kbytes of internal zero wait state SRAM and 16 Kbytes of boot ROM.

The MatchPort NR also contains the following:

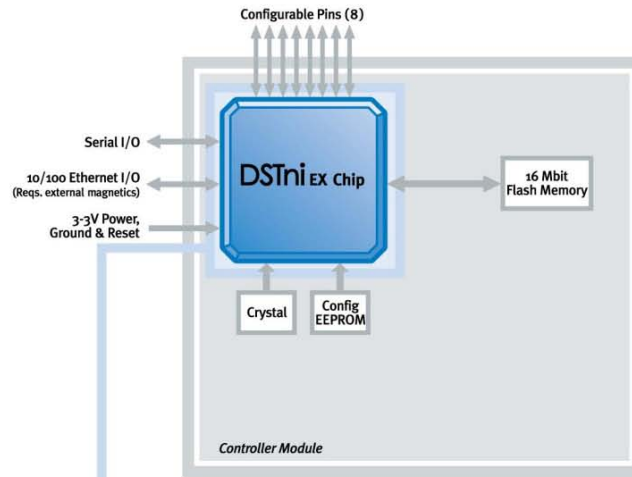
- ◆ Two 3.3 volt, CMOS level, asynchronous serial interfaces (5 volt tolerant)
- ◆ Support for RS-232 and RS-485 up to 921 Kbps
- ◆ 16 Mbit flash memory
- ◆ 26 (low), 48 (regular), 88 (high) MHz clock
- ◆ 10/100 Mbps Ethernet transceiver (requires external magnetics and RJ45)
- ◆ 8 configurable pins

The MatchPort NR requires +3.3-volt power and is designed to operate within a temperature range of -40°C to +70°C.

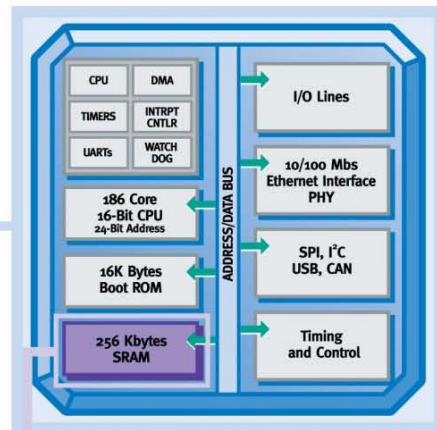
MatchPort NR Block Diagram

The following drawing is a block diagram of the MatchPort NR showing the relationships of the components.

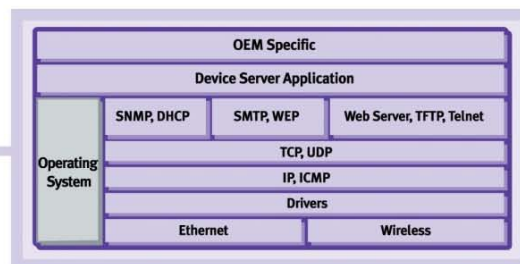
Figure 2-1. MatchPort NR Block Diagram



MatchPort



EX Chip Hardware Diagram



Internal Software Portfolio

PCB Interface

Table 2-1. PCB Interface Signals

Pin #	Name	Function	Pin #	Name	Function
1	Reset IN#	Active low Reset. Min reset input 2 ms. Leave floating if unused.	2	GND	Signal Ground
3	NC	No Connect	4	NC	No Connect
5	TXD1	Transmit data output (logic level), port 0	6	TX+	Ethernet TX+
7	RTS1	Request to Send output (logic level), port 0	8	TX-	Ethernet TX-
9	RXD1	Receive data input (logic level), port 0	10	TXCT	Ethernet TX center tap
11	CTS1	Clear to Send input (logic level), port 0	12	RXCT	Ethernet RX center tap
13	CP1	Configurable pin	14	RX+	Ethernet RX+
15	CP2	Configurable pin	16	RX-	Ethernet RX-
17	CP3	Configurable pin	18	ELED1	Ethernet Link (active low)
19	CP4	Configurable pin	20	ELED2	Ethernet Activity (active low)
21	TXD2	Transmit data output (logic level), port 1	22	NC	No connect
23	RTS2	Request to Send output (logic level), port 1	24	NC	No connect
25	RXD2	Receive data input (logic level), port 1	26	NC	No connect
27	CTS2	Clear to Send input (logic level), port 1	28	RES	Reserved for future use
29	CP5	Configurable pin	30	RES	Reserved for future use
31	CP6	Configurable pin	32	NC	No connect
33	CP7	Configurable pin	34	NC	No connect
35	CP8	Configurable pin	36	NC	No connect
37	3.3V	3.3V power input	38	NC	No connect
39	GND	Signal Ground	40	NC	No connect

Note: For all the configurable pins, see the MatchPort User Guide for selectable functions.

Mating Connector

MatchPort can be soldered directly to the PCB using the footprint shown in Figure 2-9. If a socket is required, two 2 mm 20-pin sockets spaced 1.42" apart can be used (e.g., Samtec P/N SMM-120-02-S-S-TR).

Serial Input/Output

The unit has two serial ports compatible with RS232 serial standards at data rates up to 921 Kbps. The serial I/O signals are 3.3V CMOS logic level and pins are 5V tolerant. Serial signals connect to the OEM CPU/UART. For evaluation and prototype work, it is convenient to have an external RS-232 interface that can connect to the serial port on a PC. The MatchPort Demo Board has RS-232/422/485 transceivers to implement this external interface.

If desired, use the CPs to create a DTE or DCE-style interface using any three available CPs. To create these interfaces, connect the signals according to Table 2-2. and Table 2-4.

Note: CPx, and CPy are any of the available CPs.

Table 2-2. RS232 Connections

MatchPort NR		DCE Connector			DTE Connector		
Signal (Logic)	Description	DB9	DB25	Signal	DB9	DB25	Signal
RXDx	Data In	2	3	RXDx	3	2	TXDx
TXDx	Data Out	3	2	TXDx	2	3	RXDx
RTSx	H/W Flow Control Output	7	4	RTSx	8	5	CTSx
CTSx	H/W Flow Control Input	8	5	CTSx	7	4	RTSx
CPx	Modem Control Input	1	8	DCDx	4	20	DTRx
CPy	Modem Control Output	4	20	DTRx	1	8	DCDx

Table 2-3. JP6 RS422/485 Connections

MatchPort NR Signal (logic)	Description	RS485 Signal	JP6 Pin	DB25 4 Wire	DB25 2 Wire	DB9 4 wire	DB9 2 wire
TXD1	Data Out	TX+485	4	14	14	7	7
TXD1	Data Out	TX-485	3	15	15	3	3
RXD1	Data In	RX+485	2	21	14	2	7
RXD1	Data In	RX-485	1	22	15	8	3
RTS1	TX Enable						
CP3	RS485 Select						
CP4	RS485 2-wire						

Table 2-4. JP9 RS-422/485 Connections

MatchPort NR Signal (logic)	Description	RS-485 Signal	JP9 Pin	DB25 4 Wire	DB25 2 Wire	DB9 4 wire	DB9 2 wire
TXD2	Data Out	TX+485	4	14	14	7	7
TXD2	Data Out	TX-485	3	15	15	3	3
RXD2	Data In	RX+485	2	21	14	2	7
RXD2	Data In	RX-485	1	22	15	8	3
RTS2	TX Enable						
CP7	RS-485 Select						
CP8	RS-485 2-wire						

Sample Layouts for RS-485 Connectivity

Figure 2-2. Combined RS-232/422 Transceiver

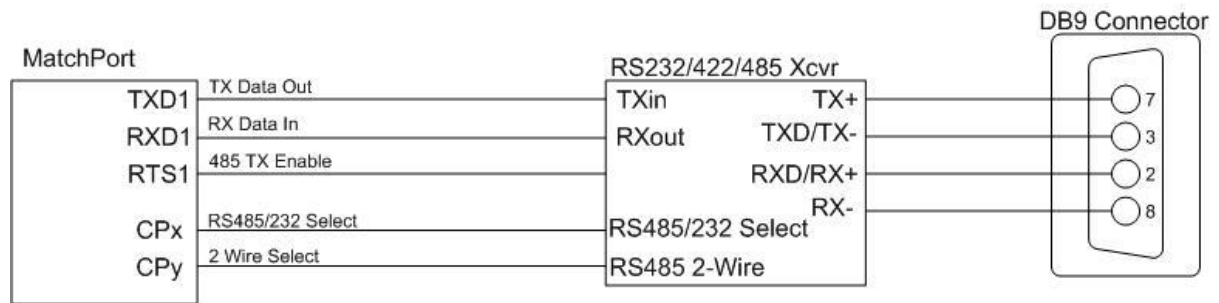


Figure 2-3. Separate RS-232/422 Transceivers

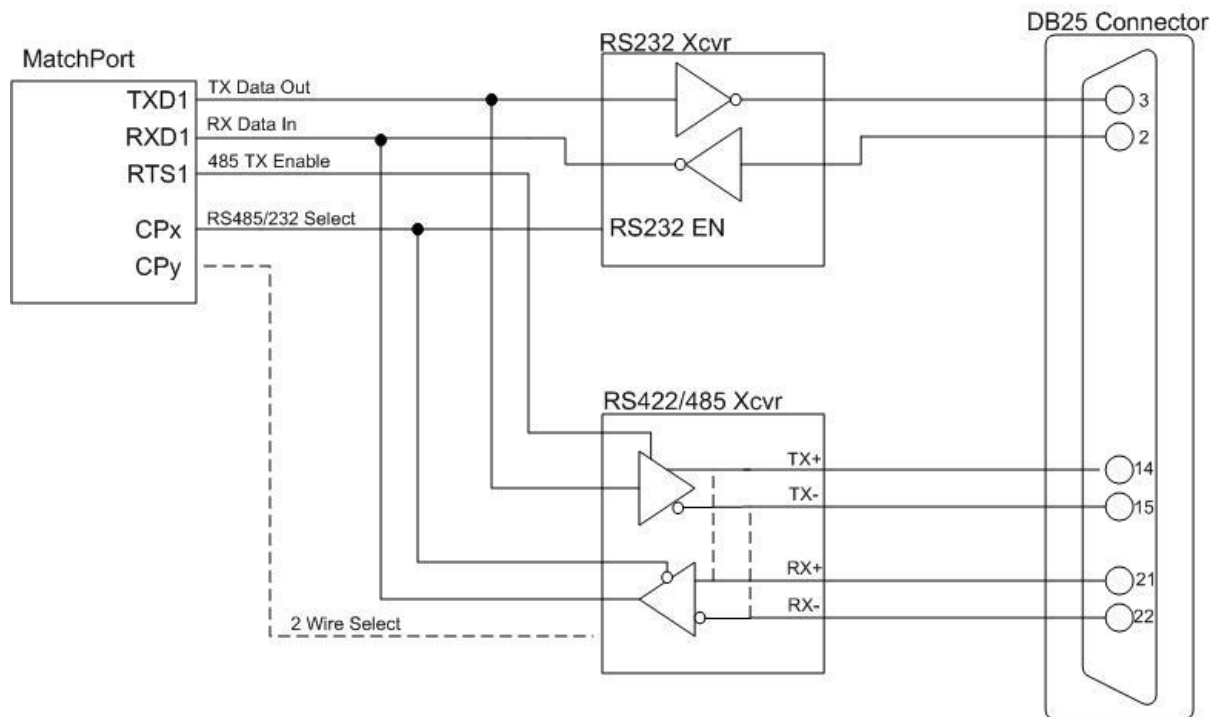
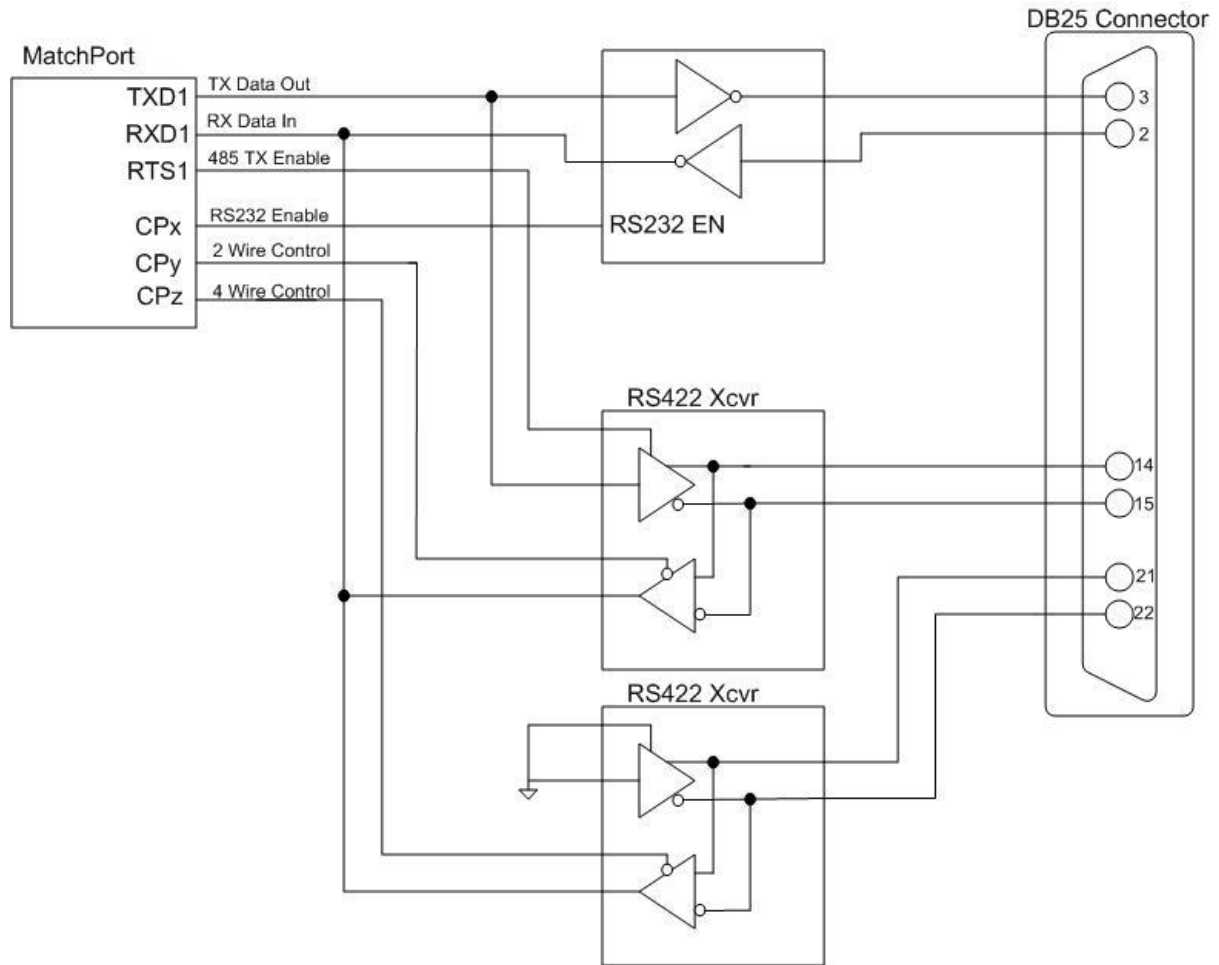


Figure 2-4. Separate RS-422 Transceivers for 2-Wire and 4-Wire Setups



Ethernet Layout

For Ethernet external component connections and layout information, see the Application Note: [How to Connect a Lantronix Embedded Module to a Wired Ethernet Port](#).

Power, Ground, and Reset Pins

Table 2-5. Power, Ground, and Reset Pins

Power	Ground	Reset
Pin 37	Pin 2	Pin 1
	Pin 39	

Driving the Reset In line low resets the MatchPort NR. Minimum reset pulse width is 2 ms at IIL = -500uA.

Absolute Maximum Ratings

Table 2-6. Absolute Maximum Ratings

Parameter	Min	Max	Units
Supply Voltage	3.0	3.6	V
Input Voltage	-0.5	6	V
Output Voltage	-0.5	6	V
Operating Temperature	-40	70	°C
Storage Temperature	-40	85	°C

Recommended Operating Conditions

The following table illustrates the optimal and recommended operating conditions for the MatchPort NR device.

Table 2-7. Operating Conditions, Serial Ports, & Configurable Pins

Parameter	Min	Typical	Max	Units
Supply Voltage	3.135	3.3	3.45	V
Voltage Ripple			2	%
VIL Input Low Voltage*	-0.3		0.8	V
VIH Input High Voltage*	2		5.5	V
II Input Leakage Current*		+/- 10 nA	+/- 1 µA	
VOL Output Low Voltage @ IOL max*			0.4	V
VOH Output High Voltage @ IOH max*	2.4			V
TXDx, RTSx IOL Low Level Output Current @ VOL 0.4V	2.2	3.5	4.3	mA
CP1-CP8 Low Level Output Current @VOL 0.4V	4.4	7.1	8.5	mA
TXDx, RTSx IOH High Level Output Current @ VOH 2.4V	-3.2	-6.4	-10.0	mA
CP1-CP8 IOH High Level Output Current @ VOH 2.4V	-3.2	-6.4	-10.0	mA

* For UART and CP pins

Technical Specifications

Table 2-8. Technical Specifications

Category	MatchPort NR
CPU, Memory	Lantronix DSTni-EX 186 CPU, 256 KB zero wait state SRAM 2048 KB Flash, 16 KB Boot ROM
Firmware	Upgradeable via TFTP and serial port
Reset Circuit	Reset In is low active. Minimum reset pulse width is 2 ms at IIL = -500 µA
Serial Interface	CMOS (Asynchronous) 3.3V - level signals Speed software selectable (300 bps to 921 Kbps)
Serial Line Formats	7 or 8 data bits, 1-2 Stop bits, Parity: odd, even, none
Modem Control	DTR, DCD
Flow Control	XON/XOFF (software), CTS/RTS (hardware), none
Network Interface	Ethernet 10Base-T or 100Base-T (auto sensing) (Ethernet with external magnetics and RJ45)
Protocols Supported	ARP, UDP, TCP, Telnet, ICMP, SNMP, DHCP, BOOTP, Auto IP, HTTP, SMTP, TFTP

Category	MatchPort NR
Management	Internal web server, SNMP (read only) Serial login, Telnet login, DeviceInstaller software
Internal Web Server	Serves web pages WEB storage capacity: 1.2 MB
Typical Average Current with 3.3V Input Voltage at 25C	100Mbps Ethernet, CPU speed low Idle-Link = 168 mA. Idle-No Link = 115 mA. Active (Data transfer 230.4 kbps both ports) = 168 mA. 10Mbps Ethernet, CPU speed low Idle-Link = 193 mA. Idle-No Link = 193 mA. Active (Data transfer 230.4 kbps both ports) = 193 mA. 100Mbps Ethernet, CPU speed Normal Idle-Link = 195 mA. Idle-No Link = 142 mA. Active (Data transfer 230.4 kbps both ports) = 195 mA. 10Mbps Ethernet, CPU speed Normal Idle-Link = 221 mA. Idle-No Link = 221 mA. Active (Data transfer 230.4 kbps both ports) = 221 mA. 100Mbps Ethernet, CPU speed High Idle-Link = 239 mA. Idle-No Link = 188 mA. Active (Data transfer 230.4 kbps both ports) = 239 mA. Active (Data transfer 921.6 kbps both ports) = 240 mA. 10Mbps Ethernet, CPU speed High Idle-Link = 268 mA. Idle-No Link = 268 mA. Active (Data transfer 230.4 kbps both ports) = 268 mA.
Security	Password protection, locking features
Weight	14g
Cover Material	ABS
Temperature	Operating range: -40°C to +70°C Storage range: -40°C to +85°C (-40°F to 185°F)
Warranty	2-year limited warranty
Included Software	Windows™ 98/NT/2000/XP based Device Installer configuration software and Windows™ based Com Port Redirector, DeviceInstaller, and Web-Manager.

Dimensions

The MatchPort NR dimensions are shown in the following diagrams. All tolerances $\pm .005$ in unless otherwise noted.

Figure 2-5. Side View

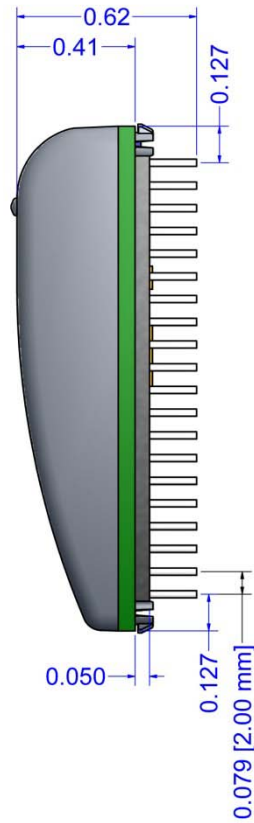


Figure 2-6. Rear View

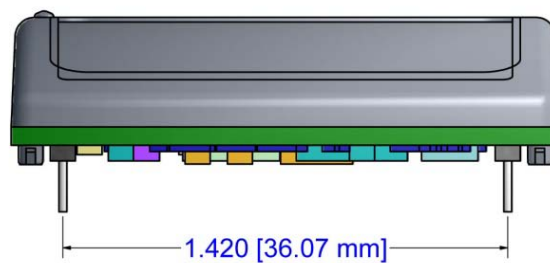


Figure 2-7. Top View

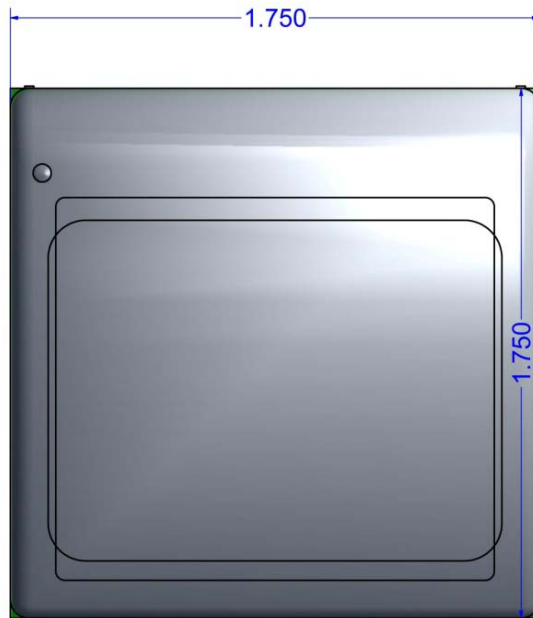
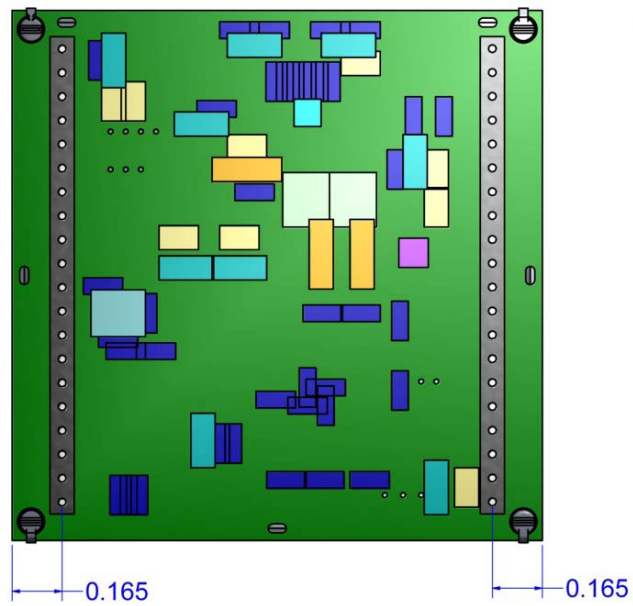
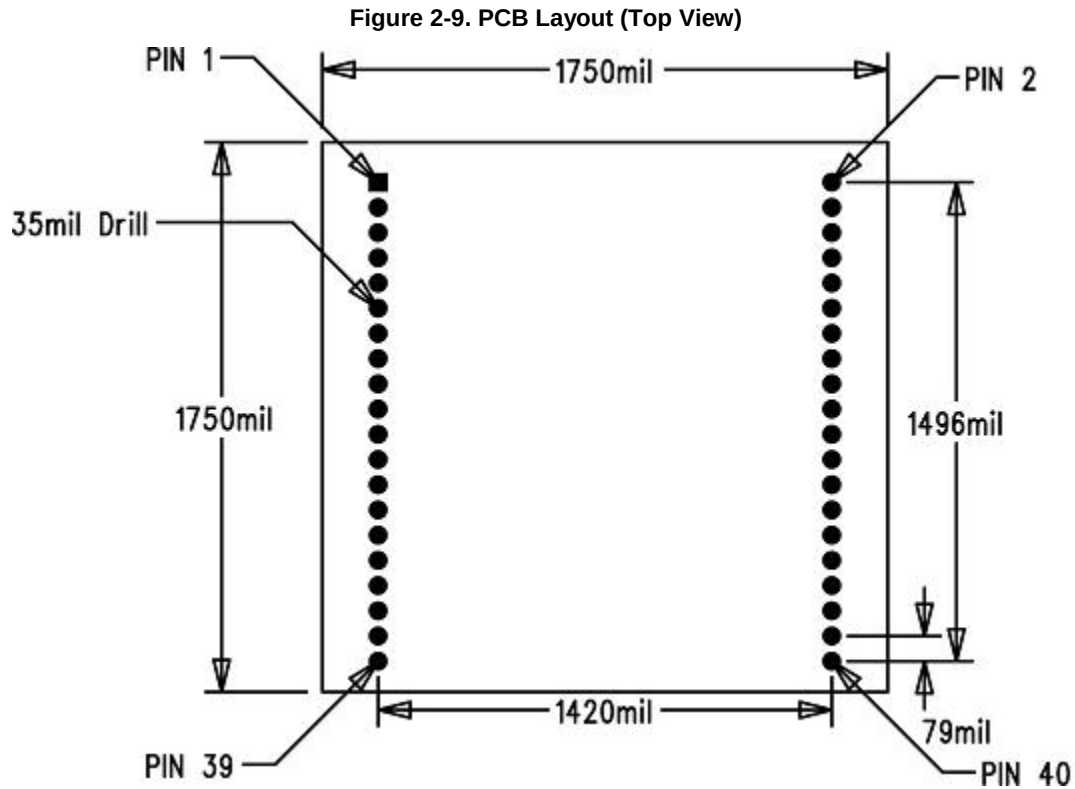


Figure 2-8. Bottom View



Recommended PCB Layout

The hole pattern and mounting dimensions for the MatchPort NR device server are shown in the following drawing:



Product Information Label

The product information label contains important information about your specific unit, such as its product ID (name), bar code, part number, and MAC address.



3: Demonstration Kit

The MatchPort NR Demonstration Kit includes everything needed to begin to integrate the MatchPort NR into a given product design.

Contents of the Kit

The Demonstration Kit contains the following items:

- ◆ MatchPort Demo Board
- ◆ 3.6V Power Supply
- ◆ RS-232 cable, DB9F/F, null modem
- ◆ Ethernet cable

***Note:** You must purchase the MatchPort NR sample separately for use with this Demonstration Kit.*

Demo Board Description

The MatchPort Demo Board provides a test platform for the Lantronix MatchPort NR device server. It supplies 3.3V power. The MatchPort demo board provides access to all signals to and from the MatchPort NR device server. The demo board has two serial port interfaces (CON1 and CON2). The MatchPort NR demo board also includes an RJ45 connector for use with wired Ethernet.

Serial Interfaces

The MatchPort NR serial interface is 3.3V logic level and typically connected to a Universal Asynchronous Receiver/Transmitter (UART). For connection to an external device, the demo board has RS-232/422/485 transceivers. CON1 and CON2 support RS-232/485. Connect to a PC using a null-modem serial cable with 9-pin connectors (F/F).

The following table lists the RS-232 signals and corresponding pins on the MatchPort NR. All signals are level-shifted by the RS-232 transceivers.

Table 3-1. RS-232 Signals

MatchPort NR PIN FUNCTION	DB9 Pin #
UART x	Conx
TXDx (Data Out)	3
RXDx (Data In)	2
CTSx (HW Flow Control Input)	8
RTSx (HW Flow Control Output)	7
DCDx (Modem Control Input)	1
DTRx (Modem Control Output)	4

Table 3-2. RS-485 4-Wire Connector

MatchPort NR Signal	Description	DB9 Pin #
TX+	Data Out	7
TX-	Data Out	3
RX+	Data In	2
RX-	Data In	8

Power Supply

The demo board uses an external 3.3V regulated supply (included with kit). The demo board contains additional filtering and protection.

General Control

The following table denotes the configuration of the demo board. Configuring the jumper re-routes the signals on the demo board as required for a given product. This also drives the LEDs.

Configuration Switch Bank

Table 3-3. Demo Board JP1 Jumper Configuration

JP1 pin/Signal	JP1 pin/Signal	Function
1/CP1	2/LED12	Jumper 1-2, CP1 Controls LED12
3/CP2	4/LED11	Jumper 3-4, CP2 Controls LED11
5/CP3	6/LED10	Jumper 5-6, CP3 Controls LED10
7/CP4	8/LED9	Jumper 7-8, CP4 Controls LED9
9/CP5	10/LED8	Jumper 9-10, CP5 Controls LED8
11/CP6	12/LED7	Jumper 11-12, CP6 controls LED7
13/CP7	14/LED6	Jumper 13-14, CP7 controls LED6
15/CP8	16/LED5	Jumper 15-16, CP8 controls LED5

Table 3-4. Demo Board JP7 Jumper Configuration for CON1

JP7 pin/Signal	JP7 pin/Signal	Function
1/TXD1	2/TXA	Jumper 1-2, Send TXD to RS-232/485 transceiver.
3/RTS1	4/RTSA	Jumper 3-4, Send RTS to RS-232/485 transceiver. In 485 mode RTS controls transmit enable.
5/CP3	6/SEL4XXA	Jumper 5-6, CP3 high selects 485 mode, low 232 mode.
7/RXD1	8/RXA	Jumper 7-8, Receive RXD from RS-232/485 transceiver.
9/CTS1	10/CTSA	Jumper 9-10, Receive CTS from RS-232 transceiver.
11/CP4	12/HDPX4XXA	Jumper 11-12, In 485 mode, CP4 selects full duplex when low, half duplex when high.
13/CP1	14/DTRA	Jumper 13-14, CP1 drives DTR to RS-232 transceiver.
15/CP2	16/DCDA	Jumper 15-16, CP2 receives DCD from RS-232 transceiver.

Table 3-5. Demo Board JP8 Jumper Configuration for CON2

JP8 pin/Signal	JP8 pin/Signal	Function
1/TXD2	2/TXB	Jumper 1-2, Send TXD to RS-232/485 transceiver.
3/RTS2	4/RTSB	Jumper 3-4, Send RTS to RS-232/485 transceiver. In 485 mode RTS controls transmit enable.
5/CP7	6/SEL4XXB	Jumper 5-6, CP7 high selects 485 mode, low 232 mode.
7/RXD2	8/RXB	Jumper 7-8, Receive RXD from RS-232/485 transceiver.
9/CTS2	10/CTSB	Jumper 9-10, Receive CTS from RS-232 transceiver.
11/CP8	12/HDPX4XXB	Jumper 11-12, In 485 mode, CP8 selects full duplex when low, half duplex when high.
13/CP5	14/DTRB	Jumper 13-14, CP5 drives DTR to RS-232 transceiver.
15/CP6	16/DCDB	Jumper 15-16, CP6 receives DCD from RS-232 transceiver.

Table 3-6. Demo Board JP5 Jumper Configuration

Pin/Signal	Pin/Signal	Function
1/3V3	2/3V3_UUT	MatchPort UUT power input jumper for current measurement. Jumper 1-2 must be installed to provide power to UUT.

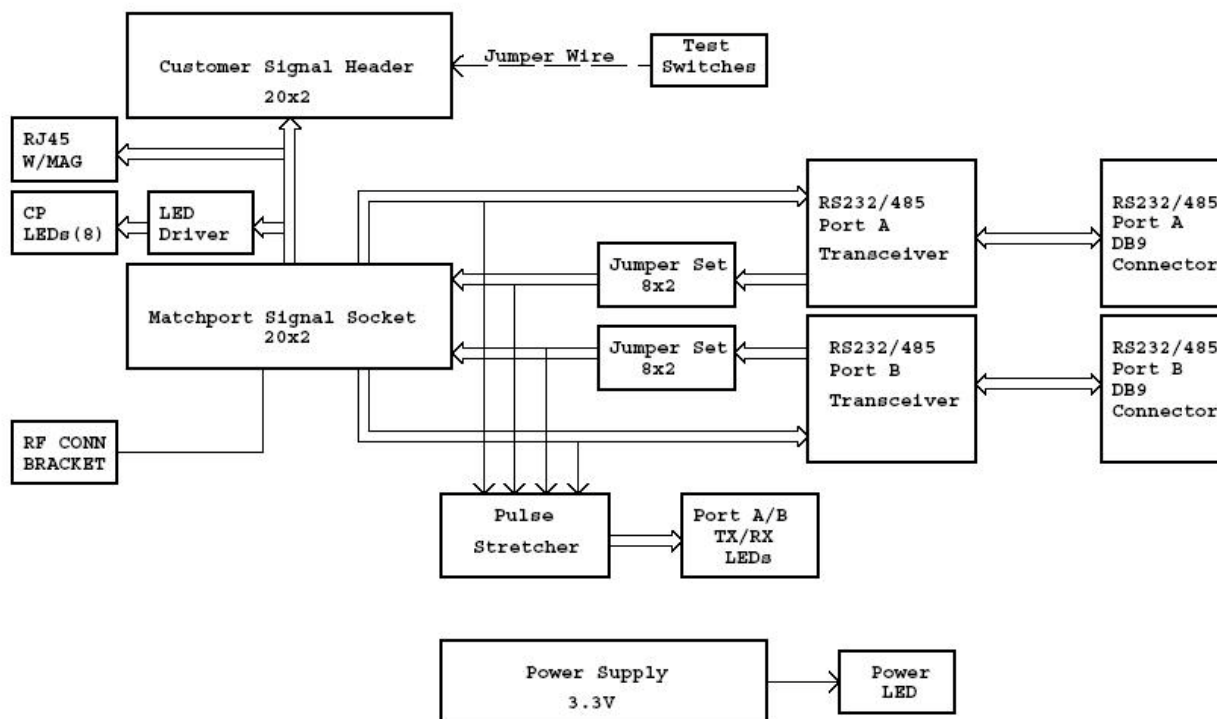
Note: If using CPs for any combination of the above demo board configurations, please use the appropriate CP function selection as shown in Table 3-5. If assigning a CP for any function other than the serial port, the jumper for the associated CP pin should be removed from JP1, JP7, or JP8 to avoid conflict with the serial port function.

Table 3-7. Demo Board Configurable Pin Jumper Configurations

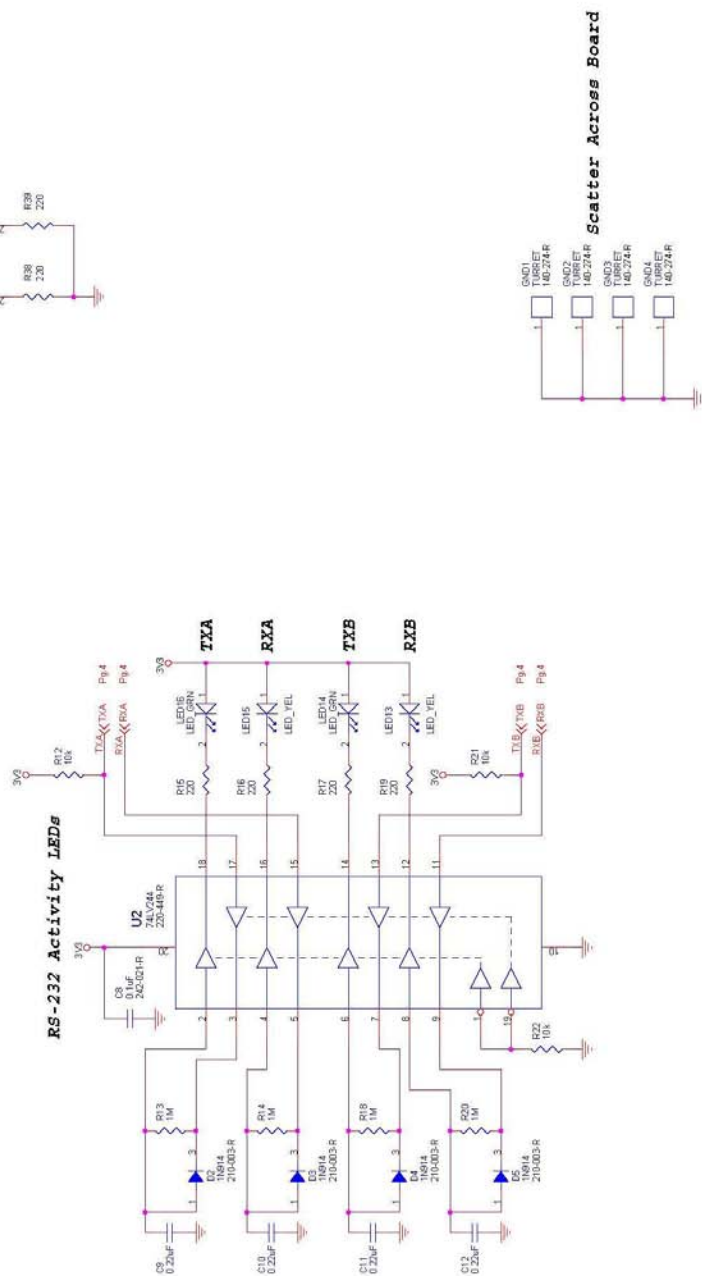
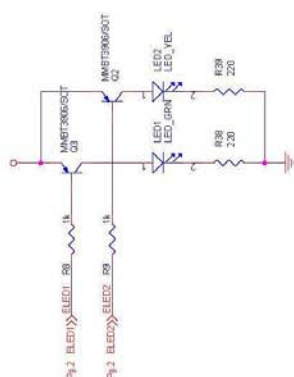
Configurable Pin	JP1 Function	JP7,JP8 Function
CP1	LED12	JP7, CON1 DTR
CP2	LED11	JP7, CON1 DCD
CP3	LED10	JP7, CON1 RS-485/232 Select
CP4	LED9	JP7, CON1 RS-485 Duplex Select
CP5	LED8	JP8, CON2 DTR
CP6	LED7	JP8, CON2 DCD
CP7	LED6	JP8, CON2 RS-485/232 Select
CP8	LED5	JP8, CON2 RS-485, Duplex Select

Demo Board Schematics

Figure 3-2. Demo Board Schematics









A: Compliance and Warranty Information

Compliance Information

(According to ISO/IEC Guide 22 and EN 45014)

Manufacturer's Name & Address:

Lantronix 167 Technology Drive, Irvine, CA 92618 USA

Declares that the following product:

Product Name Model: MatchPort NR Embedded Device Server

Conforms to the following standards or other normative documents:

Safety:

UL 60950-1

CAN/CSA-C22.2 No. 60950-1-03

EN 60950-1:2001, Low Voltage Directive (73/23/EEC)

EMC & Radio:

For purposes of certification, the MatchPort NR was tested as a modular device.

CFR Title 47 FCC Part 15, Subpart B and C, Class B

Industry Canada ICES-003 Issue 4 (2004), Class B

Industry Canada RSS-Gen Issue 1 (2005)

Industry Canada RSS-210 Issue 6 (2005)

EN 301 489-1 v1.6.1 (2006-07), EMC Directive (1999/5/EC)

EN 301 489-17 v1.2.1 (2002-08), EMC Directive (1999/5/EC)

EN 300 328 v1.7.1 (2006-10), R&TTE Directive (1999/5/EC)

Australia / New Zealand AS/NZS CISPR 22 (2006), Class B

Australia / New Zealand AS/NZS 4771 (2000 + A1:2003)

EN55022: 1998 + A1: 2000 + A2: 2003

EN55024: 1998 + A1: 2001 + A2: 2003

EN61000-3-2: 2000 + A2: 2005

EN61000-3-3: 1995 + A1: 2001

RoHS Notice: All Lantronix products in the following families are China RoHS-compliant and free of the following hazardous substances and elements:

- Lead (Pb)
- Mercury (Hg)
- Polybrominated biphenyls (PBB)
- Cadmium (Cd)
- Hexavalent Chromium (Cr (VI))
- Polybrominated diphenyl ethers (PBDE)

Product Family Name	Toxic or hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr (VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
UDS1100 and 2100	0	0	0	0	0	0
EDS	0	0	0	0	0	0
MSS100	0	0	0	0	0	0
IntelliBox	0	0	0	0	0	0
XPress DR & XPress-DR+	0	0	0	0	0	0
SecureBox 1101	0	0	0	0	0	0
WiBox	0	0	0	0	0	0
UBox	0	0	0	0	0	0
MatchPort	0	0	0	0	0	0
SLC	0	0	0	0	0	0
XPort	0	0	0	0	0	0
WiPort	0	0	0	0	0	0
SLB	0	0	0	0	0	0
SLP	0	0	0	0	0	0
SCS	0	0	0	0	0	0
SLS	0	0	0	0	0	0
DSC	0	0	0	0	0	0

O: toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

Manufacturer's Contact:

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 Fax: 949-450-7249

Warranty

For details on the Lantronix warranty replacement policy, please go to our Web site at www.lantronix.com/support/warranty