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**EVB-LAN9252_SAM D51
Evaluation Board
User's Guide**

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NOTES:

Preface

NOTICE TO CUSTOMERS

All documentation becomes dated, and this manual is no exception. Microchip tools and documentation are constantly evolving to meet customer needs, so some actual dialogs and/or tool descriptions may differ from those in this document. Please refer to our web site (www.microchip.com) to obtain the latest documentation available.

Documents are identified with a “DS” number. This number is located on the bottom of each page, in front of the page number. The numbering convention for the DS number is “DSXXXXA”, where “XXXX” is the document number and “A” is the revision level of the document.

For the most up-to-date information on development tools, see the MPLAB® IDE online help. Select the Help menu, and then Topics to open a list of available online help files.

INTRODUCTION

This chapter contains general information that will be useful to know before using the EVB-LAN9252_SAM D51. Items discussed in this chapter include:

- [Document Layout](#)
- [Conventions Used in this Guide](#)
- [Warranty Registration](#)
- [The Microchip Website](#)
- [Development Systems Customer Change Notification Service](#)
- [Customer Support](#)
- [Document Revision History](#)

DOCUMENT LAYOUT

This document features the EVB-LAN9252_SAM D51. The manual layout is as follows:

- **Chapter 1. “Overview”** – This chapter provides a brief description of the EVB-LAN9252_SAM D51.
- **Chapter 2. “Getting Started”** – This chapter provides information on the setup and operation of the EVB-LAN9252_SAM D51.
- **Chapter 3. “Hardware Configuration”** – This chapter includes information on the hardware configuration of the EVB-LAN9252_SAM D51.
- **Appendix A. “Schematics”** – This appendix shows the EVB-LAN9252_SAM D51 schematics.
- **Appendix B. “Bill of Materials”** – This appendix includes the EVB-LAN9252_SAM D51 Bill of Materials.
- **Appendix C. “Silk Screens”** – This appendix includes the EVB-LAN9252_SAM D51 silk screens.
- **Appendix D. “Slave Stack Code Generation”** – This appendix details the procedure for generating a Slave Stack Code for EtherCAT operation on EVB-LAN9252_SAM D51.

CONVENTIONS USED IN THIS GUIDE

This manual uses the following documentation conventions:

DOCUMENTATION CONVENTIONS

| Description | Represents | Examples |
|--|---|---|
| Arial font: | | |
| Italic characters | Referenced books | <i>MPLAB® IDE User's Guide</i> |
| | Emphasized text | ...is the <i>only</i> compiler... |
| Initial caps | A window | the Output window |
| | A dialog | the Settings dialog |
| | A menu selection | select Enable Programmer |
| Quotes | A field name in a window or dialog | "Save project before build" |
| Underlined, italic text with right angle bracket | A menu path | <u><i>File>Save</i></u> |
| Bold characters | A dialog button | Click OK |
| | A tab | Click the Power tab |
| N'Rnnnn | A number in verilog format, where N is the total number of digits, R is the radix and n is a digit. | 4'b0010, 2'hF1 |
| Text in angle brackets < > | A key on the keyboard | Press <Enter>, <F1> |
| Courier New font: | | |
| Plain Courier New | Sample source code | #define START |
| | Filenames | autoexec.bat |
| | File paths | c:\mcc18\h |
| | Keywords | _asm, _endasm, static |
| | Command-line options | -Opa+, -Opa- |
| | Bit values | 0, 1 |
| | Constants | 0xFF, 'A' |
| Italic Courier New | A variable argument | <i>file.o</i> , where <i>file</i> can be any valid filename |
| Square brackets [] | Optional arguments | mcc18 [options] <i>file</i> [options] |
| Curly brackets and pipe character: { } | Choice of mutually exclusive arguments; an OR selection | errorlevel {0 1} |
| Ellipses... | Replaces repeated text | var_name [, var_name...] |
| | Represents code supplied by user | void main (void) { ... } |

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Please complete the enclosed Warranty Registration Card and mail it promptly. Sending the Warranty Registration Card entitles users to receive new product updates. Interim software releases are available at the Microchip website.

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- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip consultant program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

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- **Emulators** – The latest information on Microchip in-circuit emulators. This includes the MPLAB® REAL ICE™ and MPLAB ICE 2000 in-circuit emulators.
- **In-Circuit Debuggers** – The latest information on the Microchip in-circuit debuggers. This includes MPLAB ICD 3 in-circuit debuggers and PICKIT™ 3 debug express.
- **MPLAB IDE** – The latest information on Microchip MPLAB IDE, the Windows® Integrated Development Environment for development systems tools. This list is focused on the MPLAB IDE, MPLAB IDE Project Manager, MPLAB Editor and MPLAB SIM simulator, as well as general editing and debugging features.
- **Programmings** – The latest information on Microchip programmers. These include production programmers such as MPLAB REAL ICE in-circuit emulator, MPLAB ICD 3 in-circuit debugger and MPLAB PM3 device programmers. Also included are non-production development programmers such as PICSTART® Plus and PICKIT™ 2 and 3.

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- Distributor or Representative
- Local Sales Office
- Field Application Engineer (FAE)
- Technical Support

Customers should contact their distributor, representative or field application engineer (FAE) for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in the back of this document.

Technical support is available through the web site at:

<http://www.microchip.com/support>

DOCUMENT REVISION HISTORY

| Revisions | Section/Figure/Entry | Correction |
|---------------------------|----------------------|------------|
| DS50003012A (07-30-20) | Initial release | |

Chapter 1. Overview

1.1 INTRODUCTION

The EVB-LAN9252_SAM D51 Evaluation Board is an EtherCAT slave controller with dual integrated Ethernet PHYs. Each Ethernet PHY contains a Full-Duplex 100BASE-TX transceiver and supports 100 Mbps (100BASE-TX) operation.

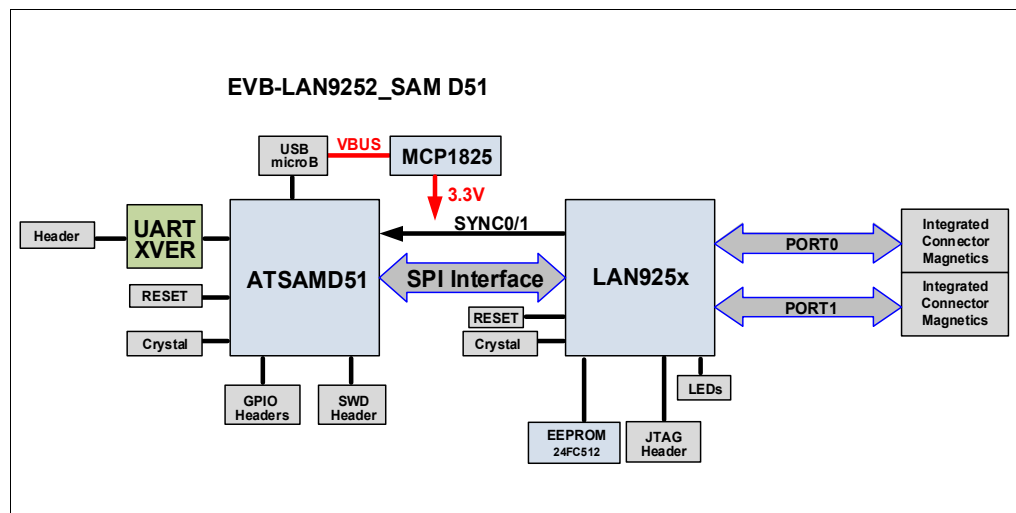
The EVB-LAN9252_SAM D51 allows users to gain understanding of the product and accelerate integration of the LAN9252 into their design. The evaluation platform supports two EtherCAT ports, and the SAMD51 processor enables the configuration of the evaluation board for EtherCAT operation. The EVB is on a four-layer RoHS-compliant Printed Circuit Board (PCB). For more information about EVB-LAN9252_SAM D51, see [Section 1.2 “Features”](#).

1.2 FEATURES

- Two-port 100BASE-TX Full-Duplex EtherCAT slave controller with integrated Ethernet PHYs
- LAN9252 in a 64-pin QFN RoHS-compliant package
- SAM D51 processor for EtherCAT configuration through EEPROM
- USB Micro-B connector for board power
- MikroBUS™ connection for external peripherals
- Two RJ-45 ports with LED link/activity indicators
- Atmel-ICE 10 pin-connector
- PICkit™ 4 8-pin header for SAM D51 programming

1.3 BLOCK DIAGRAM

FIGURE 1-1: EVB-LAN9252_SAM D51 BLOCK DIAGRAM



1.4 REFERENCES

Concepts and materials available in the following documents may be helpful when reading this document. Visit www.microchip.com for the latest documentation.

- *LAN9252 2/3-Port EtherCAT® Slave Controller with Integrated Ethernet PHYs Data Sheet*
- *SAM D5X/E5X Family Data Sheet*
- *AN 8.13 Suggested Magnetics*
- *EVB-LAN9252_SAM D51 Schematics*
- *AN1920 Microchip LAN9252 EEPROM Configuration and Programming Application Note*
- *MPLAB® PICkit™ 4 In-Circuit Debugger User's Guide*

1.5 TERMS AND ABBREVIATIONS

The following are the terms and abbreviations used in this document:

- DNP – Do Not Populate
- EEPROM – Electrically Erasable Programmable Read-Only Memory
- ESC – EtherCAT Slave Controller
- EVB – Engineering Validation Board
- EtherCAT – Ethernet for Control Automation Technology
- IDE – Integrated Development Environment
- LOS – Loss of Signal
- RJ-45 - Ethernet Port
- SD – Signal Detect
- SPI – Serial Protocol Interface
- SSC – Slave Stack Code
- TwinCAT – EtherCAT Runtime System Tool
- USB – Universal Serial Bus

Chapter 2. Getting Started

2.1 INTRODUCTION

The Microchip EVB-LAN9252_SAM D51 Evaluation Board is designed for flexible configuration solutions. It can be configured via MPLAB Harmony, TwinCAT, and Slave Stack Coding Tools. Refer to [Section 2.3 “Tools for EVB-LAN9252_SAM D51 Setup Procedure”](#) for the tools needed to configure the board for EtherCAT functionality.

2.2 KIT CONTENTS

The EVB-LAN9252_SAM D51 Evaluation Board includes the basic equipment necessary for evaluation. The items included in the board are:

- EVB-LAN9252_SAM D51 Evaluation Board
- Type-A to micro USB 2.0 cable

| |
|---|
| <p>Note: The EVB-LAN9252_SAM D51 Evaluation Board requires a PICKit™ 4 In-Circuit Debugger as additional hardware for configuration.</p> |
|---|

2.3 TOOLS FOR EVB-LAN9252_SAM D51 SETUP PROCEDURE

The following are the software and tools necessary for setting up the control or management PC and programming the EVB-LAN9252_SAM D51 Evaluation Board:

- Beckhoff TwinCAT Software
- Microchip MPLAB® X IDE (v5.30 or newer)
- Microchip XC32 Compiler
- Microchip PICKit™ 4 In-Circuit Debugger
- Microchip Harmony Plug-In (through MPLAB X IDE)
- EtherCAT® Slave Stack Code (Refer to [Appendix D. “Slave Stack Code Generation”](#))
- GitHub MPLAB Harmony v3 EtherCAT repository, which provides detailed information on creating an EtherCAT application using Harmony

On the board, jumpers are essential for the following:

- J6, positions 1-2
- J11

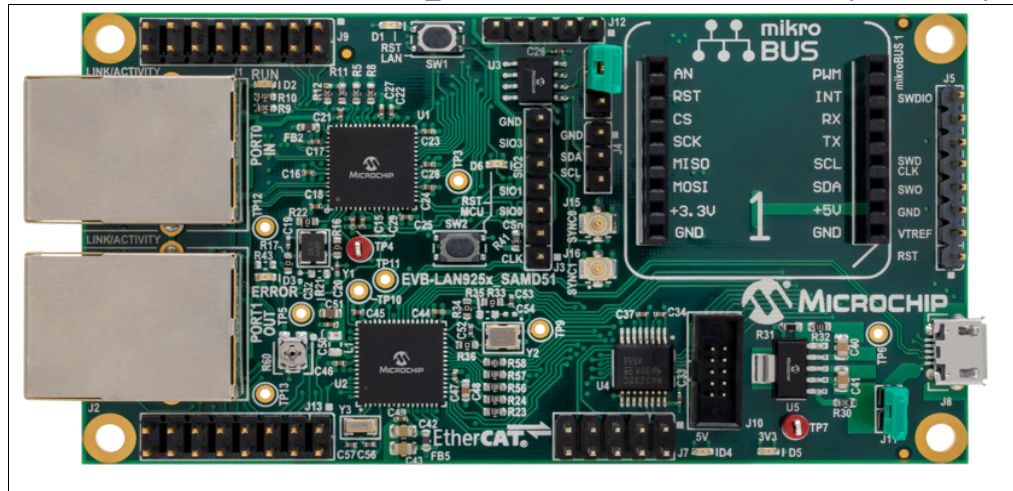
NOTES:

Chapter 3. Hardware Configuration

3.1 HARDWARE CONFIGURATION OPTIONS

Figure 3-1 shows the top view of the EVB-LAN9252_SAM D51 Evaluation Board.

FIGURE 3-1: EVB-LAN9252_SAM D51 EVALUATION BOARD (TOP VIEW)



3.1.1 Power

The EVB-LAN9252_SAM D51 can be powered by a USB cable or +5V supply. This delivers +5V and +3.3V supplies to the board. The +5V indication is provided by D4, while the +3.3V indication is provided by D5.

3.1.2 MikroBUS™

The EVB-LAN9252_SAM D51 supports click boards with an on-board MikroBUS™ connection. This allows for LCD displays, motor control, and other click board interfaces. To enable a click board, some settings need to be configured with the MCU.

3.1.3 Clocks

The EVB-LAN9252_SAM D51 Evaluation Board has the following three clocks:

1. A 25 MHz reference crystal for LAN9252 (also has an option for 25 MHz oscillator)
2. A 16 MHz crystal for SAM D51
3. A 32.768 KHz crystal for SAM D51

3.1.4 Ethernet Ports

The EVB-LAN9252_SAM D51 has two 100BASE-TX Ethernet ports for EtherCAT operation namely, J1 (PORT0 IN) and J2 (PORT1 OUT).

3.1.5 LED Indicators

Table 3-1 describes the LED indicators on the EVB-LAN9252_SAM D51.

TABLE 3-1: EVB-LAN9252_SAM D51 LED INDICATOR DESCRIPTIONS

| Ref. Des. | Label | Description |
|-------------------|---------|---|
| D1 | RST LAN | Indicates LAN9252 Reset |
| D2 | RUN | Indicates LAN9252 RUN status |
| D3 | ERROR | Indicates LAN9252 ERROR status |
| D4 | 5V | Illuminates when the 5V supply is present |
| D5 | 3V3 | Illuminates when the 3.3V supply is present |
| D6 | RST MCU | Indicates SAM D51 Reset |
| J1 (Green LED) | LINK0 | Indicates the link status of Port 0 |
| J2 (Green LED) | LINK1 | Indicates the link status of Port 1 |

3.1.6 Switches

Table 3-2 describes the switches on the EVB-LAN9252_SAM D51.

TABLE 3-2: EVB-LAN9252_SAM D51 SWITCH DESCRIPTIONS

| Ref. Des. | Label | Description |
|-----------|---------|--|
| SW1 | RST LAN | Momentary push-button switch to assert LAN9252 Reset |
| SW2 | RST MCU | Momentary push-button switch to assert SAM D51 Reset |

3.1.7 Connector Descriptions

Table 3-3 describes the connectors included on the PCB.

TABLE 3-3: EVB-LAN9252_SAM D51 CONNECTOR DESCRIPTIONS

| Ref. Des. | Type | Label | Description |
|------------|-----------------------|-----------|---|
| J1 | RJ-45 Ethernet Port | PORT0 IN | 100BASE-TX Ethernet port for EtherCAT ingress traffic |
| J2 | RJ-45 Ethernet Port | PORT1 OUT | 100BASE-TX Ethernet port for Ethernet egress traffic |
| J3 | 1x5 Header | QSPI | QSPI communication header |
| J4 | 1x3 Header | I2C | I ² C communication to the I ² C EEPROM. To enable, J6 must have jumper in positions 1 and 2. |
| J5 | 1x8 Header | PICKit-4 | PICKit™ 4 programming header/port |
| J6 | 1x3 Header | — | Selects between EEPROM programming (positions 1 and 2) and JTAG (positions 2 and 3). |
| J7 | 2x5 Header | UART | UART header to SAM D51. SAM D51 calls this Universal Synchronous and Asynchronous Receiver and Transmitter (USART). |
| J8 | Micro USB Connector | — | USB connector for power through USB cable to connected device |
| J9 | 2x8 Header | GPIO | LAN9252 GPIO test header for all LAN9252 GPIO signals (0 to 15) |
| J10 | 2x5 Header | SAM-ICE | SAM-ICE™ programming port |
| J11 | 1x2 Header | 5V | +5V voltage supply header. In a closed position, VBUS from J8 is used as the +5V supply. In an open position, external +5V must be applied to position 2. |
| J12 | 1x5 Header | JTAG | JTAG port. To enable, J6 must have jumper in positions 2 and 3. |
| J13 | 2x8 Header | — | SAM D51 input/output test header |
| J15 | Micro Coax (UMC) Jack | SYNC0 | SYNC0 reference to synchronize clocks |
| J16 | Micro Coax (UMC) Jack | SYNC1 | SYNC1 reference to synchronize clocks |
| Mikro-BUS1 | MikroBUS™ Connector | MIKROBUS | MikroBUS connection for click board connection |

3.1.8 Test Points

Table 3-4 describes the test points on the EVB-LAN9252_SAM D51. A header may be permanently installed on the through-hole test points if needed.

TABLE 3-4: EVB-LAN9252_SAM D51 TEST POINT DESCRIPTIONS

| Ref. Des. | Type | Description |
|-----------|-----------------|------------------------|
| TP4 | Test Loop (Red) | 1.2V oscillator supply |
| TP7 | Test Loop (Red) | 3.3V supply |

NOTES:



Appendix A. Schematics

A.1 INTRODUCTION

This appendix shows the EVB-LAN9252_SAM D51 Evaluation Board schematics.

FIGURE A-1: EVB-LAN9252_SAM D51 SCHEMATIC 1

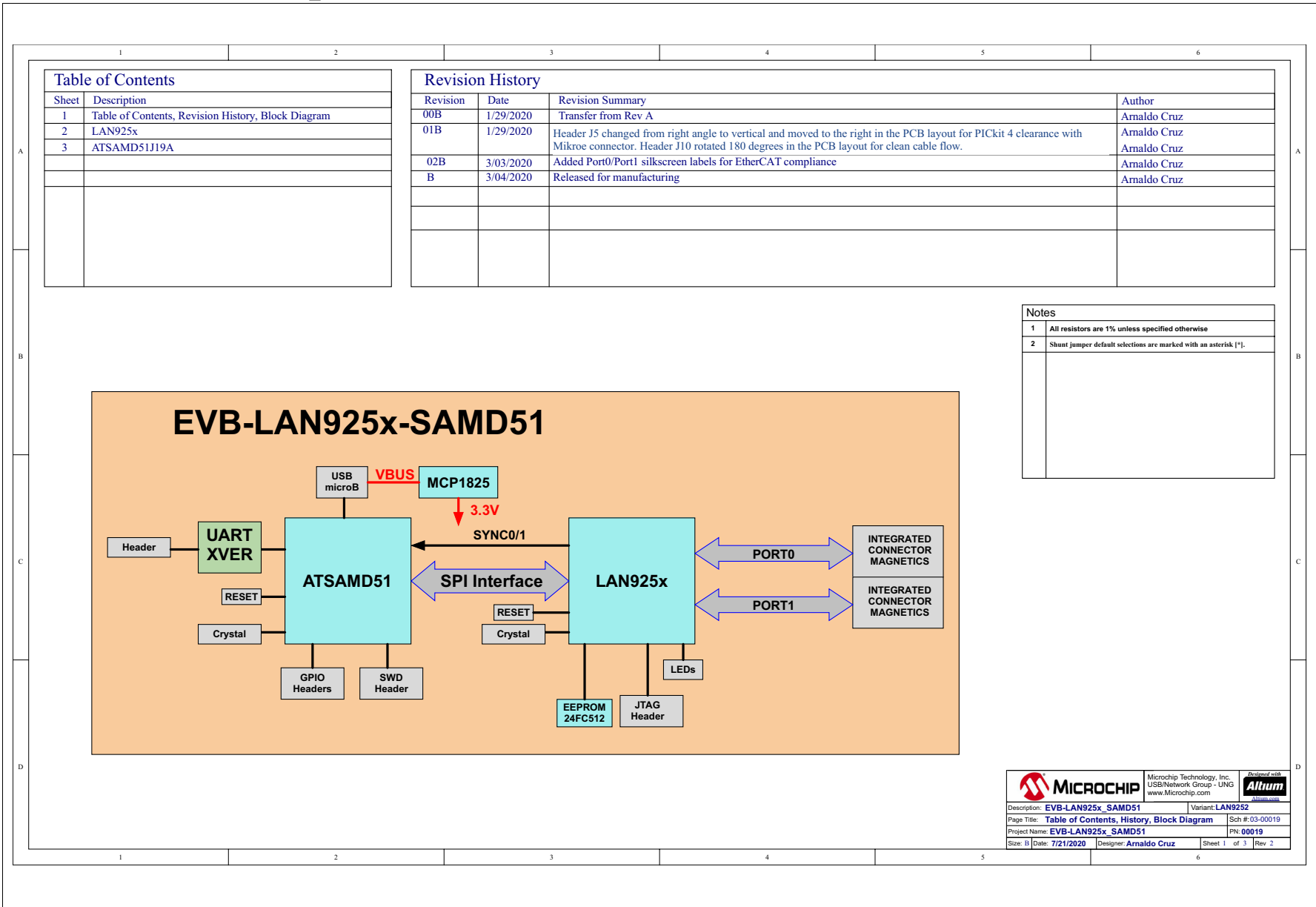
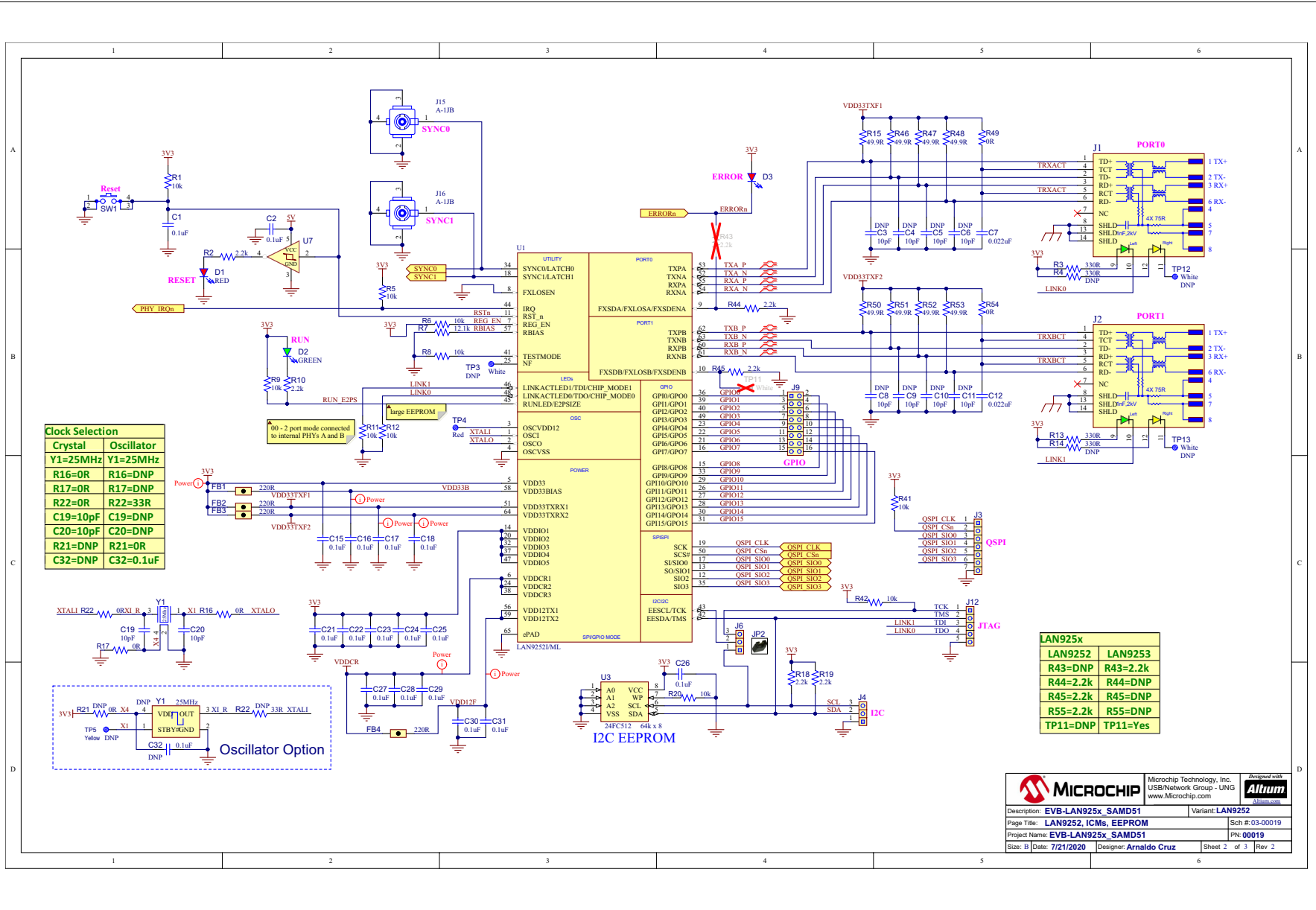
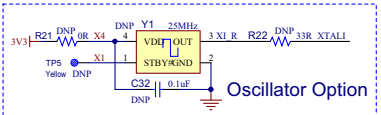


FIGURE A-2: EVB-LAN9252_SAM D51 SCHEMATIC 2



| Clock Selection | |
|-----------------|------------|
| Crystal | Oscillator |
| Y1=25MHz | Y1=25MHz |
| R16=0R | R16=DNP |
| R17=0R | R17=DNP |
| R22=0R | R22=33R |
| C19=10pF | C19=DNP |
| C20=10pF | C20=DNP |
| R21=DNP | R21=0R |
| C32=DNP | C32=0.1uF |

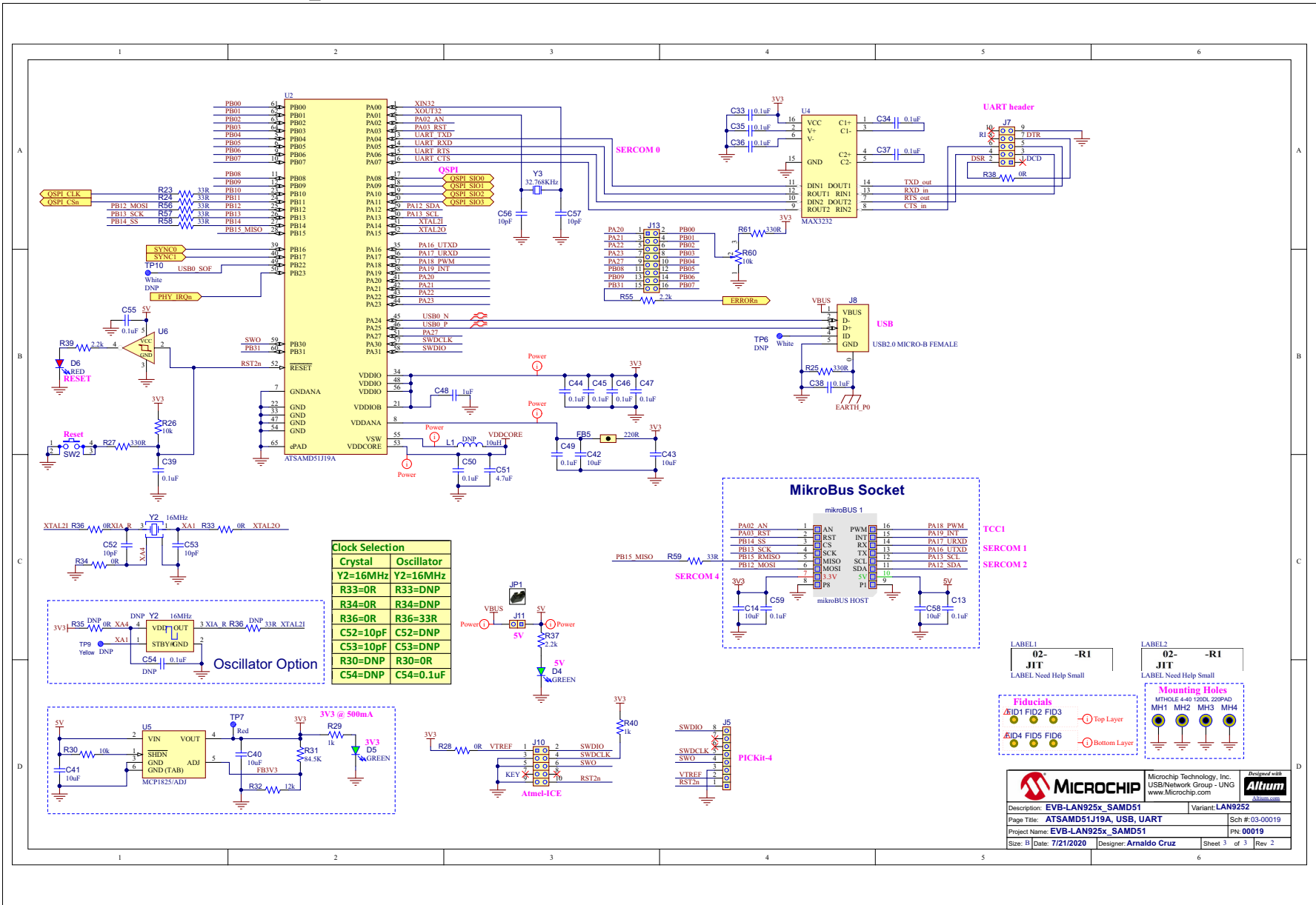


| LAN925x | LAN9252 | LAN9253 |
|----------|----------|---------|
| R43=DNP | R43=2.2k | |
| R44=2.2k | R44=DNP | |
| R45=2.2k | R45=DNP | |
| R55=2.2k | R55=DNP | |
| TP11=DNP | TP11=Yes | |

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 www.Microchip.com

Part Number: EVB-LAN925x_SAMD51 Variant: LAN9252
 Page Title: LAN9252, ICMS, EEPROM Sch #: 03-00019
 Project Name: EVB-LAN925x_SAMD51 P#: 00019
 Size: B Date: 7/21/2020 Designer: Arnaldo Cruz Sheet 2 of 3 Rev 2

FIGURE A-3: EVB-LAN9252_SAM D51 SCHEMATIC 3



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Project Name: EVB-LAN925x_SAMD51
 Variant: LAN9252
 Page Title: ATSAM51J19A, USB, UART
 Sch #: 03-00019
 Project Name: EVB-LAN925x_SAMD51
 P/N: 00019
 Size: B | Date: 7/21/2020 | Designer: Arnaldo Cruz | Sheet 3 of 3 | Rev 2



Appendix B. Bill of Materials

B.1 INTRODUCTION

This appendix contains the EVB-LAN9252_SAM D51 Evaluation Board Bill of Materials (BOM).

TABLE B-1: EVB-LAN9252_SAM D51 BILL OF MATERIALS (BOM)

| Item | Qty. | Reference | Description | Populated | Manufacturer | Manufacturer Part Number |
|------|------|---|--|-----------|----------------------------------|--------------------------|
| 1 | 33 | C1, C2, C13, C15, C16, C17, C18, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C33, C34, C35, C36, C37, C38, C39, C44, C45, C46, C47, C49, C50, C55, C59 | CAP CER 0.1uF 16V 10% X7R SMD 0402 | Yes | Murata | GRM155R71C104KA88D |
| 2 | 8 | C3, C4, C5, C6, C8, C9, C10, C11 | CAP CER 10pF 50V 5% NP0 SMD 0402 | DNP | AVX Corporation | 04025A100JAT2A |
| 3 | 2 | C7, C12 | CAP CER 0.022uF 50V 10% X7R SMD 0402 | Yes | Murata Electronics | GCM155R71H223KA55D |
| 4 | 6 | C14, C40, C41, C42, C43, C58 | CAP CER 10uF 16V 10% X5R SMD 0805 | Yes | Murata | GRM21BR61C106KE15L |
| 5 | 6 | C19, C20, C52, C53, C56, C57 | CAP CER 10pF 50V 5% NP0 SMD 0402 | Yes | AVX Corporation | 04025A100JAT2A |
| 6 | 2 | C32, C54 | CAP CER 0.1uF 50V 10% X7R SMD 0402 | DNP | TDK Corporation | C1005X7R1H104K050BB |
| 7 | 1 | C48 | CAP CER 1uF 16V 10% X5R SMD 0603 | Yes | AVX | 0603YD105KAT2A |
| 8 | 1 | C51 | CAP CER 4.7uF 10V 10% X5R SMD 0603 | Yes | KEMET | C0603C475K8PACTU |
| 9 | 3 | D1, D3, D6 | DIO RED 2V 20mA 54mcd CLEAR SMD 0603 | Yes | Lite-On Inc. | LTST-C191KRKT |
| 10 | 3 | D2, D4, D5 | DIO LED GREEN 2V 30mA 35mcd Clear SMD 0603 | Yes | Lite-On Inc | LTST-C191KGKT |
| 11 | 5 | FB1, FB2, FB3, FB4, FB5 | FERRITE 220R@100MHz 1.4A SMD 0603 | Yes | Murata Electronics North America | BLM18PG221SN1D |
| 12 | 2 | J1, J2 | CON MODULAR JACK RJ45 100 2xLEDS SHIELD TH R/A | Yes | Pulse Electronics Network | J0011D01BNL |
| 13 | 1 | J3 | CON HDR-2.54 Male 1x7 Gold 5.84MH TH VERT | Yes | Würth Electronics Inc | 61300711121 |
| 14 | 2 | J4, J6 | CON HDR-2.54 Male 1x3 Gold 5.84MH TH VERT | Yes | FCI | 68000-103HLF |
| 15 | 1 | J5 | CON HDR-2.54 Male 1x8 Gold 5.84MH TH | Yes | FCI | 68001-108HLF |
| 16 | 1 | J7 | CON HDR-2.54 Male 2x5 0.100" (2.54mm) TH VERT | Yes | Metz Connect | PR20205VBDN |
| 17 | 1 | J8 | CON USB2.0 MICRO-B FEMALE TH/SMD R/A | Yes | FCI | 10118194-0001LF |
| 18 | 2 | J9, J13 | CON HDR-2.54 Male 2x8 Gold 5.84MH TH VERT | Yes | FCI | 68602-116HLF |
| 19 | 1 | J10 | HDR 1.27mm 2x5 shrouded | Yes | CNC Tech | 3220-10-0100-00 |
| 20 | 1 | J11 | CON HDR-2.54 Male 1x2 Gold 5.84MH TH VERT | Yes | FCI | 77311-118-02LF |
| 21 | 1 | J12 | CON HDR-2.54 Male 1x5 Gold 5.84MH TH VERT | Yes | FCI | 68000-105HLF |
| 22 | 2 | J15, J16 | CON RF Micro Coaxial U.FL Male 4P SMD VERT | Yes | Amphenol RF Division | A-1JB |
| 23 | 2 | JP1, JP2 | MECH HW JUMPER 2.54mm 1x2 | MECH | Sullins Connector Solutions | QPC02SXGN-RC |
| 24 | 1 | L1 | INDUCTOR 10uH 430mA 10% SMD 0805 | DNP | Coilcraft | 0805PS-103KLC |
| 25 | 1 | mikroBUS 1 | SOCKET mikroBUS HOST DIP 16 TH | Yes | Sullins Connector Solutions | PPTC081LFBN-RC |
| 26 | 12 | R1, R5, R6, R8, R9, R11, R12, R20, R26, R30, R41, R42 | RES TKF 10k 1% 1/10W SMD 0603 | Yes | Vishay | CRCW060310K0FKEA |
| 27 | 9 | R2, R10, R18, R19, R37, R39, R44, R45, R55 | RES TKF 2.2k 1% 1/10W SMD 0603 | Yes | Panasonic | ERJ-3EKF2201V |

TABLE B-1: EVB-LAN9252_SAM D51 BILL OF MATERIALS (BOM) (CONTINUED)

| Item | Qty. | Reference | Description | Populated | Manufacturer | Manufacturer Part Number |
|------|------|---|--|-----------|-----------------------|----------------------------------|
| 28 | 5 | R3, R13, R25, R27, R61 | RES TKF 330R 1% 1/10W SMD 0603 | Yes | ROHM, Panasonic | MCR03EZPFX3300, ERJ-3EKF3300V |
| 29 | 2 | R4, R14 | RES TKF 330R 1% 1/10W SMD 0603 | DNP | ROHM | MCR03EZPFX3300 |
| 30 | 1 | R7 | RES TKF 12.1k 1% 1/10W SMD 0603 | Yes | Panasonic | ERJ-3EKF1212V |
| 31 | 8 | R15, R46, R47, R48, R50, R51, R52, R53 | RES TKF 49.9R 1% 1/10W SMD 0603 | Yes | Panasonic | ERJ-3EKF49R9V |
| 32 | 10 | R16, R17, R22, R28, R33, R34, R36, R38, R49, R54 | RES TKF 0R 1/10W SMD 0603 | Yes | Panasonic | ERJ-3GSY0R00V |
| 33 | 2 | R21, R35 | RES TKF 0R 1/10W SMD 0603 | DNP | Panasonic | ERJ-3GSY0R00V |
| 34 | 6 | R23, R24, R56, R57, R58, R59 | RES TKF 33R 1% 1/10W SMD 0603 | Yes | ROHM | MCR03EZPFX33R0 |
| 35 | 2 | R29, R40 | RES TKF 1k 1% 1/10W SMD 0603 | Yes | Panasonic | ERJ-3EKF1001V |
| 36 | 1 | R31 | RES TKF 84.5k 1% 1/10W SMD 0603 | Yes | Yageo | RC0603FR-0784K5L |
| 37 | 1 | R32 | RES TKF 12k 1% 1/10W SMD 0603 | Yes | Yageo | RC0603FR-0712KL |
| 38 | 1 | R60 | RES TRIMMER 10k 25% 0.1W SMD TC33 | Yes | Bourns Inc. | TC33X-2-103E |
| 39 | 2 | SW1, SW2 | SWITCH TACT SPST 16V 50mA PTS810 SJM 250 SMTR LFS SMD | Yes | C&K Components | PTS810 SJM 250 SMTR LFS |
| 40 | 5 | TP3, TP6, TP10, TP12, TP13 | MISC, TEST POINT MULTI PURPOSE MINI WHITE | DNP | Keystone | 5002 |
| 41 | 2 | TP4, TP7 | MISC, TEST POINT MULTI PURPOSE MINI RED | Yes | Keystone | 5000 |
| 42 | 2 | TP5, TP9 | MISC, TEST POINT PC MINI, 0.040" D YELLOW | DNP | Keystone | 5004 |
| 43 | 1 | U1 | MCHP INTERFACE ETHERNET LAN9252I/ML 64QFN | Yes | Microchip Technology | LAN9252I/ML |
| 44 | 1 | U2 | MCHP MCU 32-BIT 120MHz 1MB ATSAMD51J19A-MFT VQFN-64 | Yes | Microchip Technology | ATSAMD51J19A-MFT |
| 45 | 1 | U3 | MCHP MEMORY SERIAL EEPROM 512kb 1MHZ I2C 24FC512T-I/SN SOIC-8 | Yes | Microchip Technology | 24FC512T-I/SN |
| 46 | 1 | U4 | IC TRANSCEIVER MAX3232 SSOP-16 | Yes | Texas Instruments | MAX3232CDBR |
| 47 | 1 | U5 | MCHP ANALOG LDO ADJ MCP1825T-ADJE/DC SOT-223-5 | Yes | Microchip | MCP1825T-ADJE/DC |
| 48 | 2 | U6, U7 | 74LVC1G14GW,125 SCHMITT-TRG INVERTER | Yes | NXP | 74LVC1G14GW,125 |
| 49 | 1 | Y1 | CRYSTAL 25MHz 10pF SMD ABM8G | Yes | Abracon LLC | ABM8G-25.000MHZ-4Y-T3 |
| 50 | 1 | Y2 | CRYSTAL 16MHz 9pF 26ppm SMD L3.2W2.5H0.6 | Yes | AVX Corp/Kyocera Corp | CX3225SB16000E0FPZ25 |
| 51 | 1 | Y3 | CRYSTAL 32.768KHz 12.5pF SMD L3.2W1.5H0.9 | Yes | Fox Electronics | FK135EIH0.032768-T3 |

NOTES:



Appendix C. Silk Screens

C.1 INTRODUCTION

This appendix shows the top and bottom silk screen images of the EVB-LAN9252_SAM D51 Evaluation Board.

EVB-LAN9252_SAM D51 Evaluation Board User's Guide

FIGURE C-1: EVB-LAN9252_SAM D51 TOP SILK SCREEN IMAGE

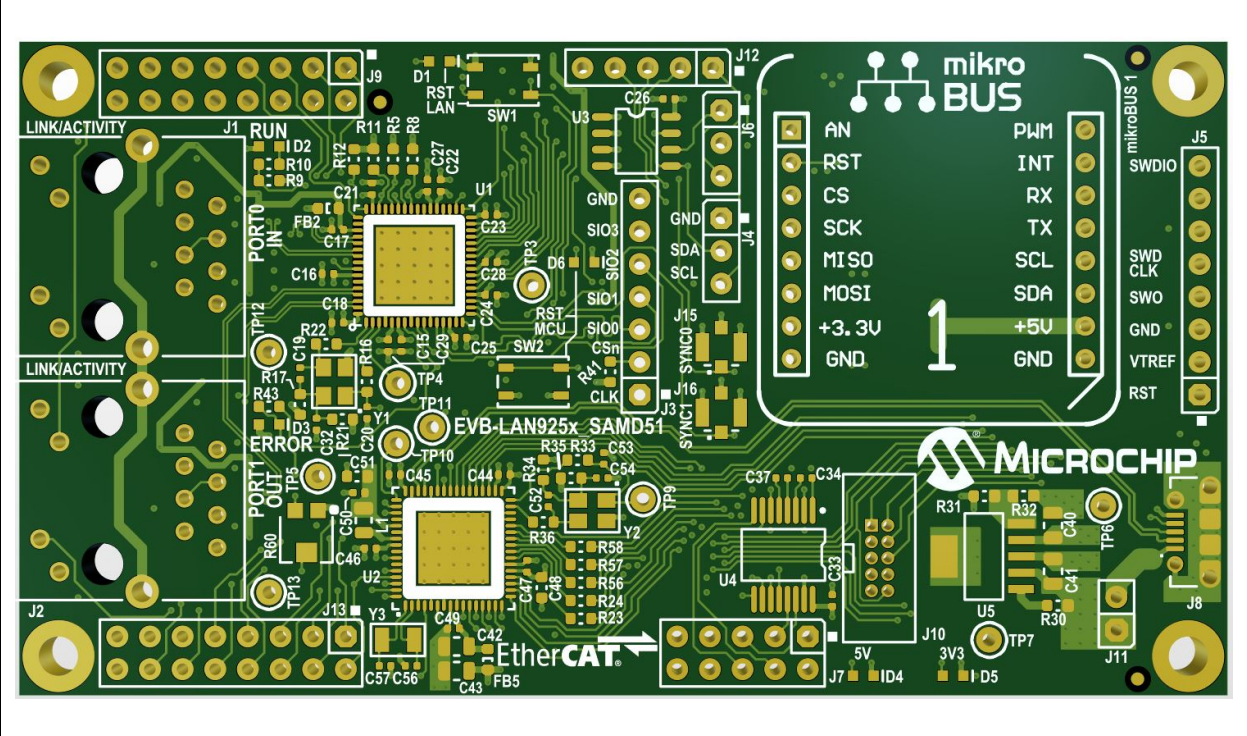
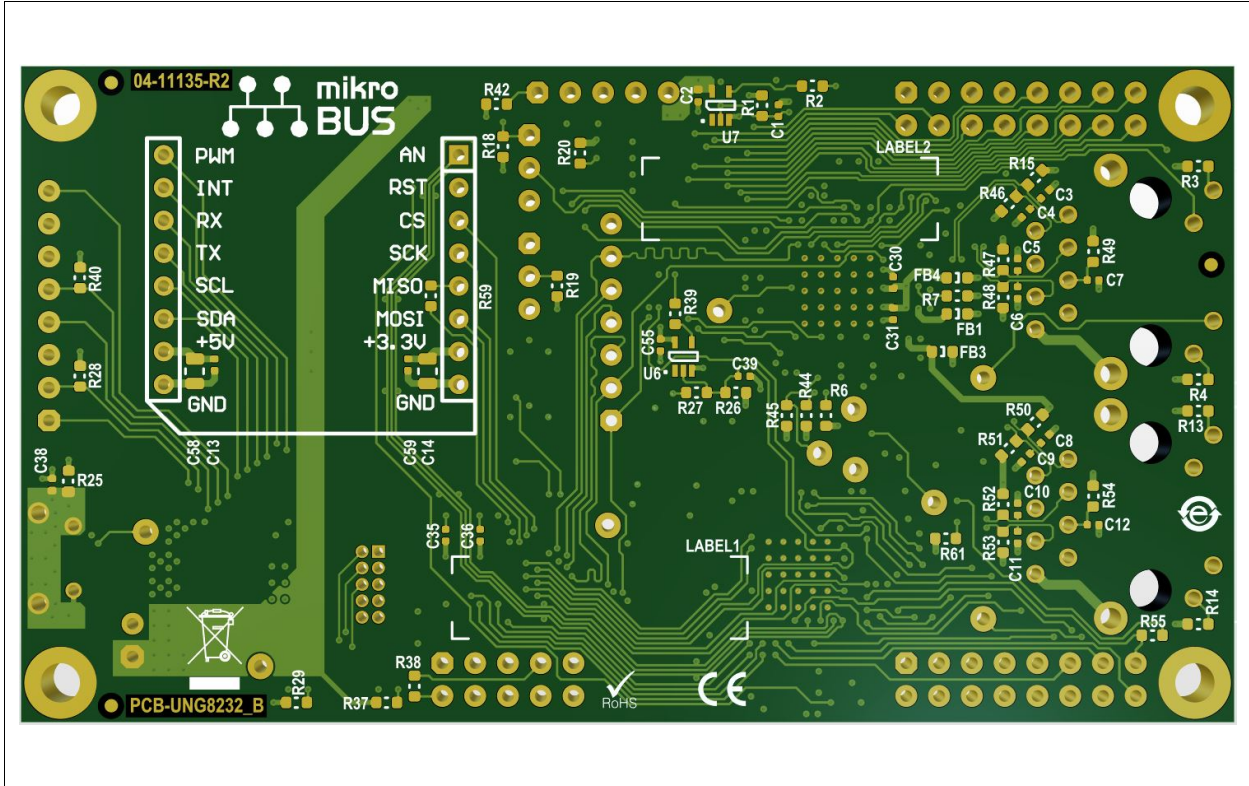


FIGURE C-2: EVB-LAN9252_SAM D51 BOTTOM SILK SCREEN IMAGE



NOTES:

Appendix D. Slave Stack Code Generation

D.1 INTRODUCTION

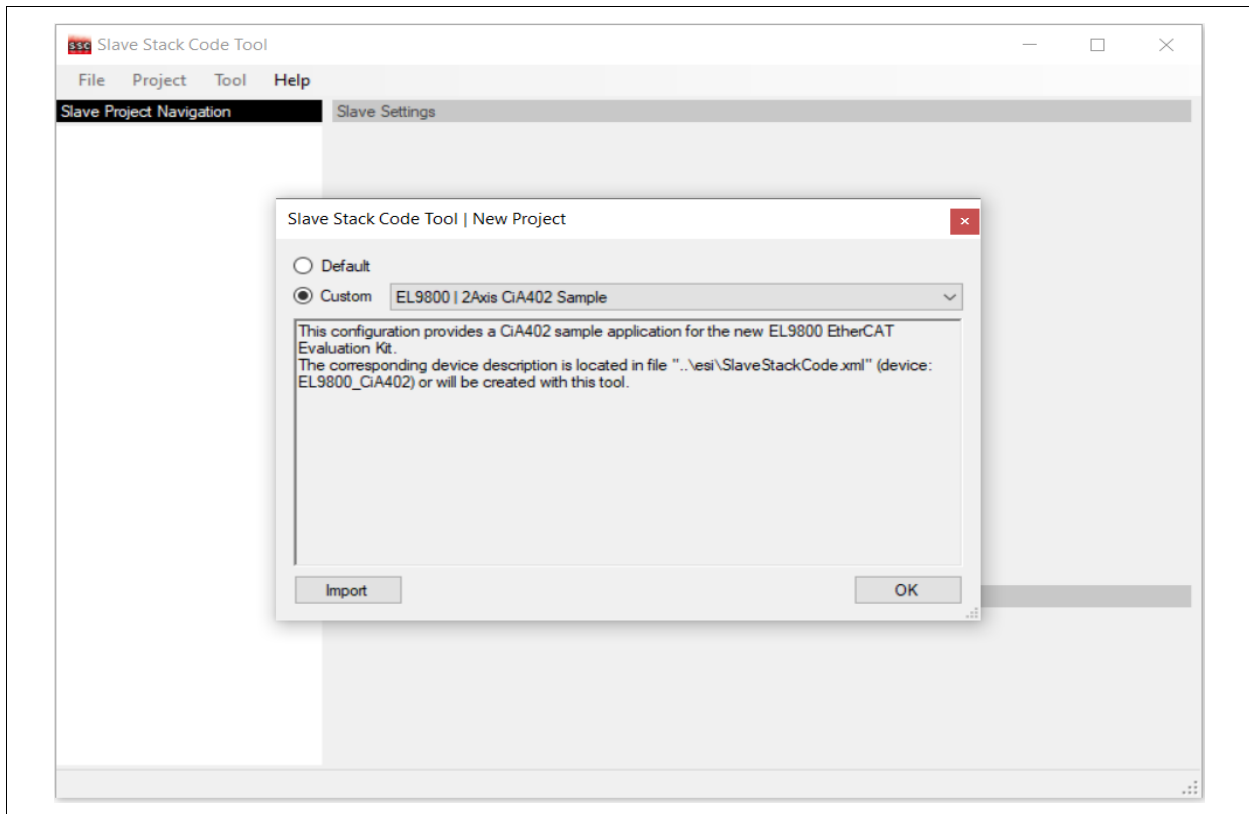
This appendix details the procedure for generating the Slave Stack Code for EtherCAT operation on the EVB-LAN9252_SAM D51 Evaluation Board.

D.2 SLAVE STACK CODE GENERATION

Perform the following steps to generate the slave stack code:

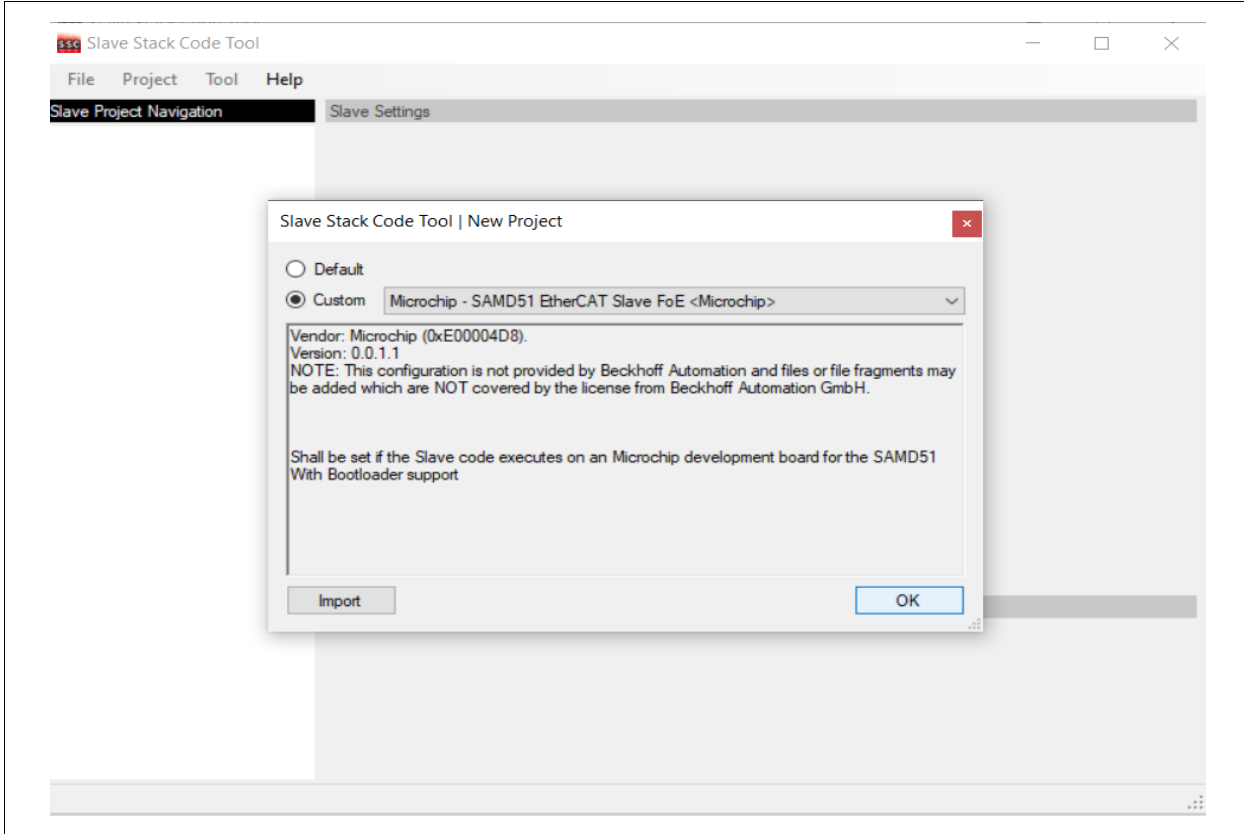
1. Download the Slave Stack Code (SCC) tool from EtherCAT.org website. An EtherCAT membership is necessary for downloading the code.
2. Install the SSC tool on the control or management PC.
3. Open the SSC tool and navigate to *File>New* to create a new project.
4. Select Custom and then click on **Import**. See [Figure D-1](#).

FIGURE D-1: SLAVE STACK CODE GENERATION – IMPORT CONFIGURATION FILE



5. Import the `Microchip-SAMD51-LAN925x-SSC_Config.xml` configuration file from `<Harmony Directory>\ethercat\apps\ethercat_counter_foe_app\firmware\src\slave_stack`. After importing this configuration file, the Microchip SAM D51 will appear in the "Custom" field. Select this and click on **OK**. Click on **Yes** for the next two prompts. See [Figure D-2](#).

FIGURE D-2: SLAVE STACK CODE GENERATION – NEW PROJECT CREATION

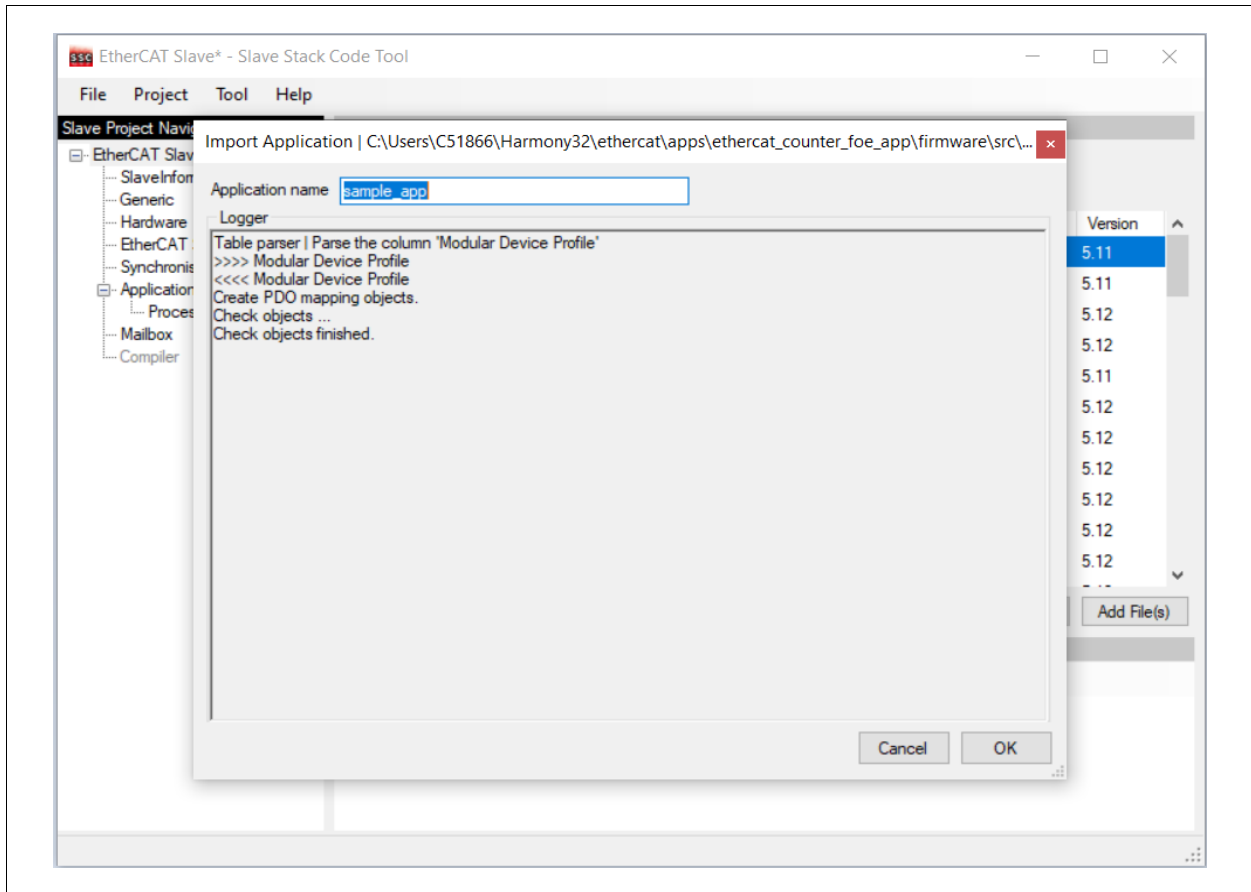


6. Navigate to the `<Harmony Directory>\ethercat\apps\ethercat_counter_foe_app\firmware\src\config\sam_d51_lan9252_evb\driver\lan9252` directory to point to the `drv_lan9252.c` file and click on **Open**. This will load the code.

Slave Stack Code Generation

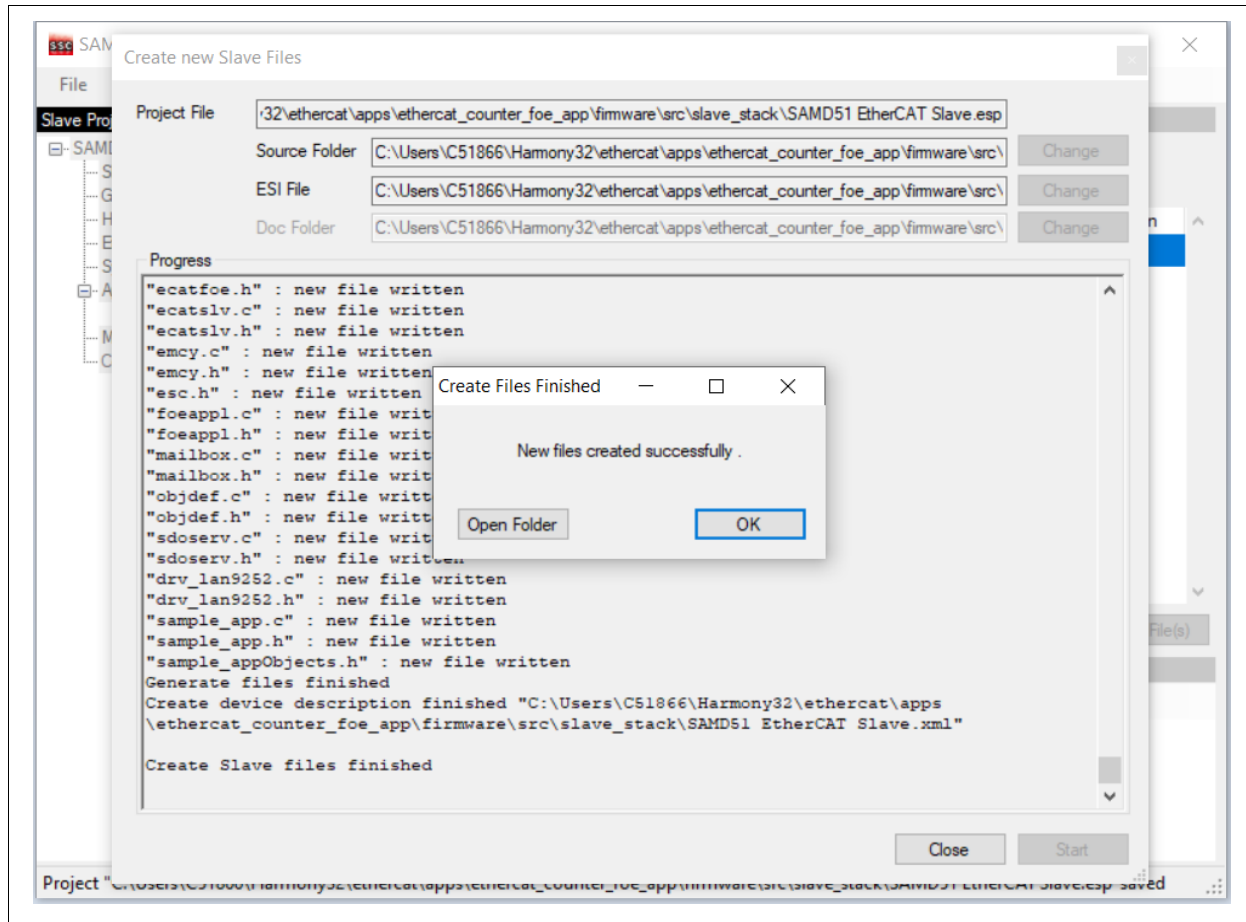
7. Go to **Tools>Application>Import Application**. In the “Application name” field, enter “sample_app” in the <Harmony Directory>\ethercat\apps\ethercat_counter_foe_app\firmware\src\slave_stack. Click on **OK**. See [Figure D-3](#).

FIGURE D-3: SLAVE STACK CODE GENERATION – IMPORT APPLICATION FILE



8. Go to **Tools>Create New Slave Files**. When prompted to save the project, save it in the directory provided. Click on the **Start** button to create the slave files. When complete, click on the **Open Folder** to open a window with all of the slave files. See [Figure D-4](#).

FIGURE D-4: SLAVE STACK CODE GENERATION – CREATE NEW SLAVE FILES



9. Copy these files from the directory in the previous step (including the `sample_app.c`, `sample_app.h`, `sample_appObject.h` and the `SAMD51 EtherCAT Slave.xml` files) and paste them to the `<Harmony Directory>\ethercat\slave_stack` directory.

NOTES:

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