Universal Scan Engine Developer's Kit

Installation Guide

Table of Contents

Universal Scan Engine Developer's Kit Installation Guide

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Patents

This product is covered by one or more of the patents listed on the Web site: http://www.symbol.com/patents.

Warranty

For the complete hardware product warranty statement, go to: http://www.symbol.com/warranty.

Revision History

Changes to the original manual are listed below:

Change	Date	Description
72E-59636-03 Rev. A	9/2007	Updated guide with SE955 and SE6700/PL6707; remove EOL scan engines.

About This Guide

Introduction

The *Universal Scan Engine Developer's Kit Installation Guide* provides general instructions for installing and configuring the Universal Development board.

Chapter Descriptions

- Chapter 1, Getting Started provides an overview of the Universal Scan Engine Developers Kit, including a description of SSI, engine mounting considerations, and general installation instructions.
- Chapter 2, Electrical Considerations describes the components of the development board.
- Appendix A, Reference Schematic provides schematic drawings of the development board kit.

Notational Conventions

The following conventions are used in this document:

- The terms client, device and terminal refer to the CA50 hand-held device.
- *Italics* are used to highlight the following:
  - chapters and sections in this and related documents
  - dialog box, window, and screen names
  - drop-down list and list box names
  - check box and radio button names
  - icons on a screen.
- **Bold** text is used to highlight the following:
  - key names on a keypad
  - button names on a screen.
- Bullets (•) indicate:
  - action items
  - lists of alternatives
  - lists of required steps that are not necessarily sequential.
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
- Text boxes:

NOTE This symbol indicates something of special interest or importance to the reader. Failure to read the note does not result in physical harm to the reader, equipment or data.

CAUTION This symbol indicates that if this information is ignored, the possibility of data or material damage may occur.

WARNING! **This symbol indicates that if this information is ignored, the possibility that serious personal injury may occur.**

IMPORTANT This symbol indicates that an important step is required to complete a task correctly.

Related Publications

Universal Software Developer's Kit Programmer Guide, p/n 72-59860-xx.

Service Information

If you have a problem with your equipment, contact Motorola Enterprise Mobility Support for your region. Go to http://www.symbol.com/contactsupport. If you purchased your Motorola product from a Motorola Business Partner, contact that Business Partner for service.

Before contacting, have the model number and serial number at hand. If your problem cannot be solved by the Motorola Enterprise Mobility Support, you may need to return your equipment for servicing and you will be given specific directions.

Motorola is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

Chapter 1 Getting Started

Introduction

The Universal Scan Engine Developer's Kit (UDK), p/n DKSE-1000-000, provides the software and hardware tools needed to design and test an embedded scan engine application before integration into a host device.

This guide explains how to install and configure the scan engine. The *SSI Software Developer's Kit Programmer Guide* explains how to use the Simple Serial Interface (SSI) UDK. This UDK is a complete package that enables users to benefit from Motorola's SSI protocol used in all of our decoded and imager engine offerings: SE955, SE1223HP, SE1224, SE2223, SE3223, SE4400/PL4407 and SE6700/PL6707. The kit consists of a developer's board, interface cables, and 5 V universal power supply. The *Simple Serial Interface Developer's Guide* facilitates communication and rapid development in the host device. The latest version of the SSI Software Developer's Kit can be downloaded from the link below.

The UDK offers many user-friendly features and allows developers to use one development platform to work with all Motorola's decoded engines, so the development board can be re-used for all decoded engine integration projects.

NOTE Visit http://www.symbol.com/support for the latest documentation and downloads.

UDK Mechanical Parts

The UDK consists of the mechanical items shown in Figure 1-1 and Figure 1-2.

(2X) M2- .4 X 4 mm L

(FOR SE2223, SE1224, SE1223)

(4X) M1.6- .35 X 6 mm L

(FOR PL4407, PL6707)

(2X) M1.6- .35 X 3.5 mm L

(FOR SE955)

Figure 1-1 *UDK Mechanical Parts (Drawings not to Scale)*

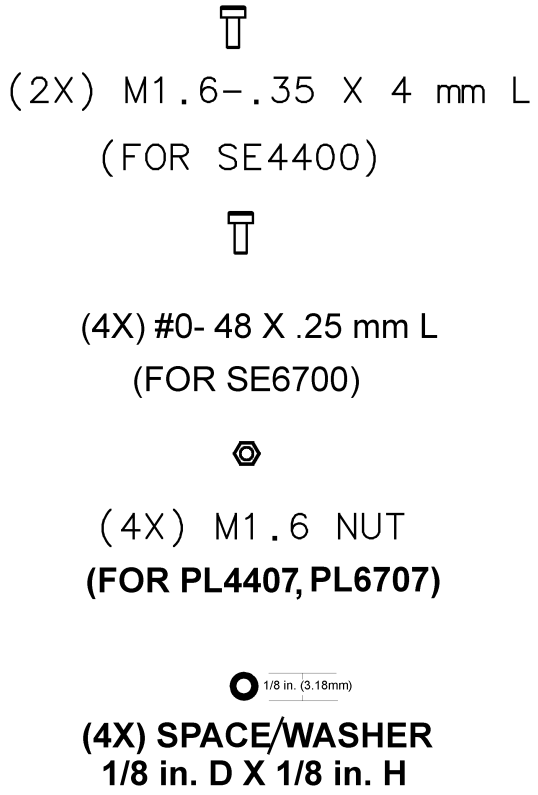


Figure 1-2 *UDK Mechanical Parts - continued (Drawings not to Scale)*

Mounting Considerations

CSE600

The miniature form factor of the CSE600 engine requires special mounting considerations.

1. Install the Vertical Board Guides (included in the kit) into the holes labeled "F".
2. Place the adhesive rubber bumper (included in the kit) inside the dotted circle labeled "BUMPER" between the two "F" holes.
3. Install one end of the CSE600 flex into J8 on the UDK board, and the other end into the engine.
4. Slide the engine into the Vertical Board Guides so it faces forward (away from J8). The rubber bumper protects the flex by preventing the engine from being pushed against the board.

SE4400/PL4407

1. Install the engine to the holes near the edge of the UDK board labeled "A" using the screws provided in the kit.
2. Install the PL4407 decoder board to the four holes in the middle of the UDK board labeled "A" using the screws and nuts provided in the kit.
3. Install two flexes as follows. First, install one end of the SE4400 flex into the smaller connector on the PL4407 and the other end into the engine. Next, install one end of the PL4407 host flex into J23 on the UDK board and the other end into the larger connector on the PL4407.

SEX22X

1. Install the engine to the corresponding holes based on the information contained in Table 1 on the UDK board silk-screen, using the screws provided in the kit.
2. Install one end of the appropriate flex into J4 on the UDK board and the other end into the engine.

SE955

1. Install the SE955 engine to the corresponding holes of the UDK board labeled "D" using the screws provided in the kit.

SE6700/PL6707

1. Install the PL6707 decoder board to the four holes in the middle of the UDK board labeled "A" using screws, spacer/washer and nuts provided in the kit.
2. Install two flexes as follows. First, install the dark shielded flex (p/n 15-99087-xx) into the SE6700 camera connector with the flex pins positioned towards the center of the SE6700 (i.e., mate the metal area of the flex with the metal pins of the connector). Mate the other end of the flex with the PL6707 camera connector (the connector located on the side of the board with few components present (i.e., the connector on the side opposite the microprocessor). Ensure the latches on both sides are pressed in securely.
3. Install the white host flex to connector J23 on the UDK board and other end to the PL6707 host connector. The PL6707 connector is on the same side as the microprocessor. Ensure the metal connection on the flex aligns with the metal connection connectors - the connector latch must be lifted to enable the flex to slide in. When the flex is in place, press down securely to latch the flex.

4. Mount the SE6700 engine to the corresponding holes of the UDK board labeled "G" using the screws provided in the kit.

NOTE The heat sink on the bottom of the SE6700 fits into the cut out area of the UDK board.

Simple Serial Interface

The Simple Serial Interface (SSI) provides a cost effective, highly integrated, flexible protocol for designing bar code scanning applications and Auto-ID markets using Motorola’s broad range of engines. SSI provides a communications link between Motorola's decoded engines and a serial host.

Development Board

The UDK PCB accommodates multiple scope probes, debug aids, and provides a large work area for developers. The board also has many ground and VCC posts so users can easily probe and simulate logic levels on scanner lines.

Since the board supports all decoded engines, instructions for configuring the board to an engine is silk-screened on the board.

NOTE Not all connectors provided on the board are used with every engine.

Quick Installation

The following installation procedure is typical for most development applications, and does not address all board features. For detailed debugging and testing, see the appropriate sections of this guide.

1. Install the four white PCB standoffs (included in the kit) by snapping them into the corresponding holes in the corners of the UDK board.
2. Mount the engine on the development board. See *UDK Mechanical Parts on page 1-2* and *Mounting Considerations on page 1-4* for assistance.
3. Determine the voltage requirements for the engine. See Table "1" in Figure 1-3 on page 1-7, which is silk-screened on the board, or see *Table 2-1 on page 2-2*.

CAUTION Be sure to set the voltage on the board to the proper voltage for the engine. Applying incorrect voltage can destroy the engine.

4. Configure the power supply on the board to the correct output voltage determined in Step 3 by setting the jumpers on header J29 as specified in *Power Configuration - Block 1 on page 2-1*.
5. Add a jumper to the appropriate header that connects the board voltage to the engine. See *Table 2-1 on page 2-2*.
6. If using the PL4407/SE4400 or PL6707/SE6700, configure the System Configuration Bits to reflect the proper communication bus to the host. See *Host Communication Configuration - Block 3 (SE4400/PL4407 and SE6700/PL6707) on page 2-4*.
7. Install the 13 Break Out Header jumpers on headers J17, J18, J14, and J21. See *Signal Breakout - Block 4 on page 2-5*.
8. Connect the interface cable between the development board and the host system.
9. Connect the DC power cord between the power supply and connector J1 on the development board.
10. Connect the AC cord between the power supply and an AC outlet.

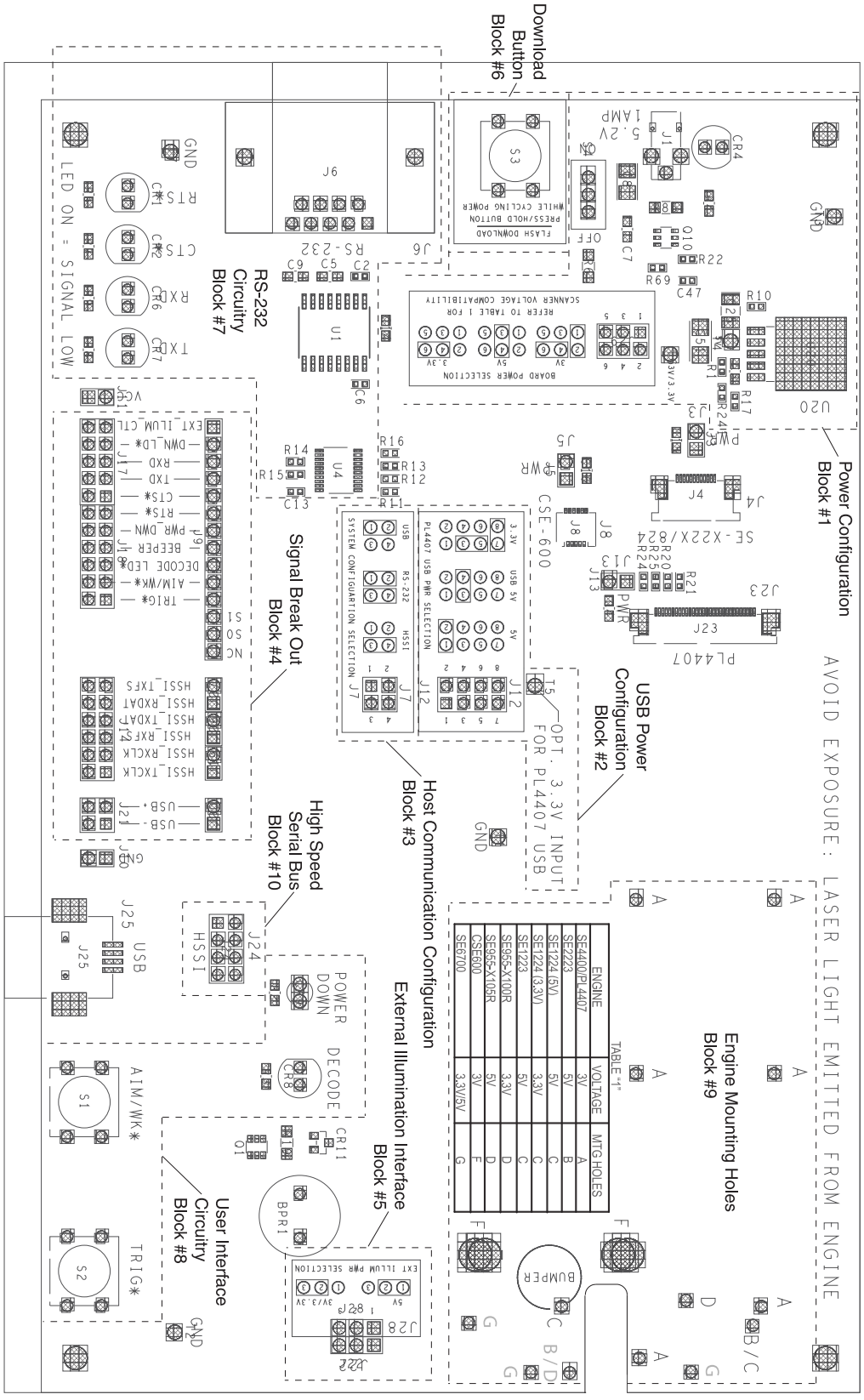


Figure 1-3 *Universal Development Board Assembly*

Chapter 2 Electrical Considerations

Introduction

The UDK is a universal development board for all Motorola data capture engines. The board supports the decoded imaging solutions SE6700/PL6707, SE4400/PL4407 and CSE600, and laser-based engines such as the SE2223, SE1223, SE1224 and SE955. The board includes a detailed silk screen to assist in installation and use of the engines during development. Each major part of the board is described in the following section.

Board Functional Descriptions

The following sections detail the specific components on the board. Figure 1-3 on page 1-7 indicates each component or group of components on the assembly in outlined areas, by block number.

Power Configuration - Block 1

Block one (1) represents board power configuration and selection. Since the UDK board supports many decoded engines, configure the power supplied to the engine to the voltage specified in Table 1, which is silk-screened on the PCB. To set engine power, populate jumpers on J29 according to the figures silk-screened on the PCB in the section labeled *Board Power Selection*. The electrical schematic and jumper configurations are shown in Figure 2-1 and Figure 2-2. For the selected voltage, attach a jumper to J29 where a rectangle is drawn.

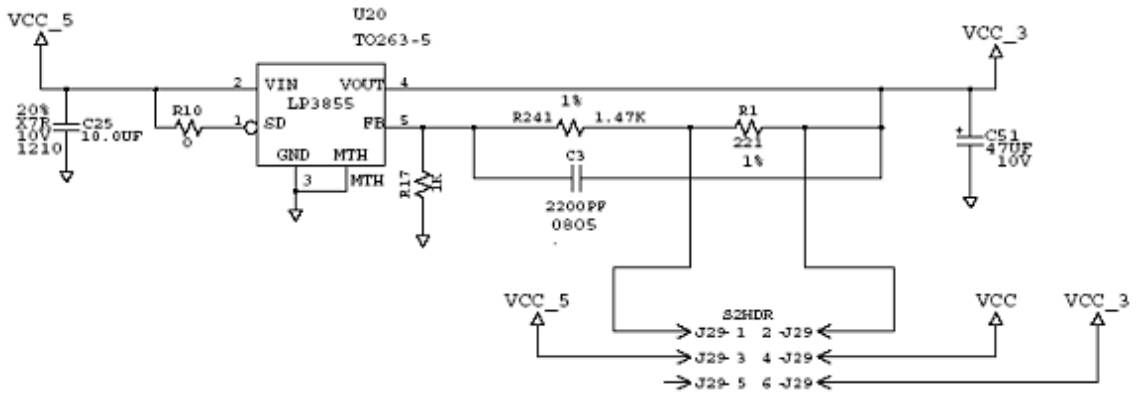


Figure 2-1 *Electrical Schematic*

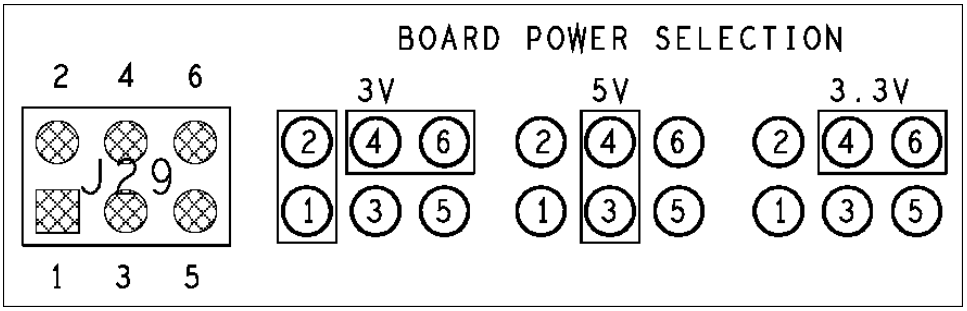


Figure 2-2 *Jumper Configurations for Power*

In addition to configuring the voltage to the engine, populate a jumper to supply power to the particular engine being used. Populate the jumper on the appropriate power enable header according to Table 2-1. As an alternative to the jumper, place an ammeter across this power enable header to measure the current draw of the engine.

An external power supply connected to J1 supplies the power, regardless of whether the USB connection is used. If no power supply is connected to J1, all power is supplied to the UDK board and scan engine through the USB connection. Ensure the power switch located near the power jack (J1) is in the ON position to enable power to the UDK board and scan engine. The red LED adjacent to J1 indicates that the UDK board is powered, and is on even if the appropriate power enable header does not have the necessary jumper.

Table 2-1 *Power Enable Headers*

Engine	Connector	Power Enable Header
SE6700/PL6707	J23	J13 *
SE4400/PL4407	J23	J13
SE2223	J4	J3
SE1224 (5V)	J4	J3
SE1224 (3.3V)	J4	J3
SE1223	J4	J3
SE955	J4	J3
CSE600	J8	J5

* Configure board power (J29) for 5V, install J12 (1-2) to enable SE6700 illumination.

USB Power Selection - Block 2 (SE4400/PL4407 and SE6700/PL6707)

NOTE Not all Motorola engines support the USB interface.

The jumper pad in Figure 2-3 provides three power options (indicated on the silk screen) for the PL4407 and PL6707.

USB subsystem:

- Supply the USB system with +5 V from the DC power jack (J1). To do this (based on the silk screen), install the jumper on J12 pins 1-2.
- Supply the USB system with +5 V from the USB bus via connector J25. To do this (based on the silk screen), install the jumper on J12 pins 3-4. DO NOT install the power supply in J1; the power switch (S4) still controls the power to the board.
- Supply the USB system with +3.3 V. To do this (based on the silk screen), install the jumper on J12 pins 7-8, then drive 3.3 V in terminal T5 located next to J12. Ensure the external supply is also referenced to the board ground which can be located on J10 or any of the four black test posts (T1, T2, T3, and T7).

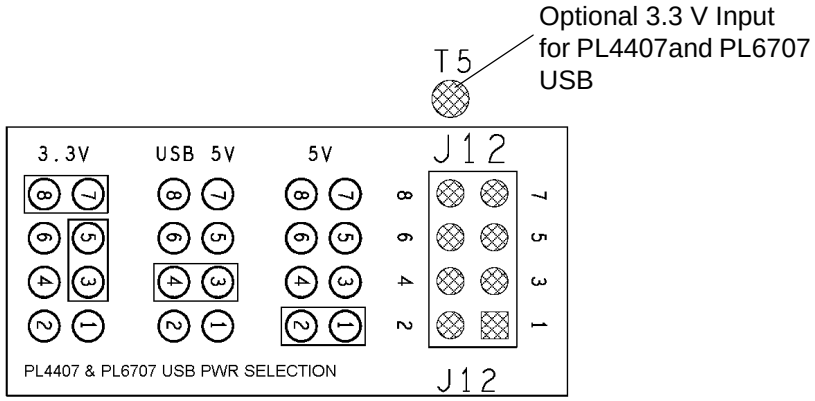


Figure 2-3 *Jumper Configurations for USB Power*

Host Communication Configuration - Block 3 (SE4400/PL4407 and SE6700/PL6707)

The jumper pad in Figure 2-4 sets the system configuration bits, which determine the type of communication between the PL4407/PL6707 and a host. Based on the silk screen the following jumper configurations set the desired communication method:

Table 2-2 *Jumper Settings for Host Communication*

Communication Type	Jumper Settings for J7
RS-232	Install jumper on pins 1-2 and 3-4
USB	Install jumper on pins 1-2
HSSI	Install jumper on pins 3-4

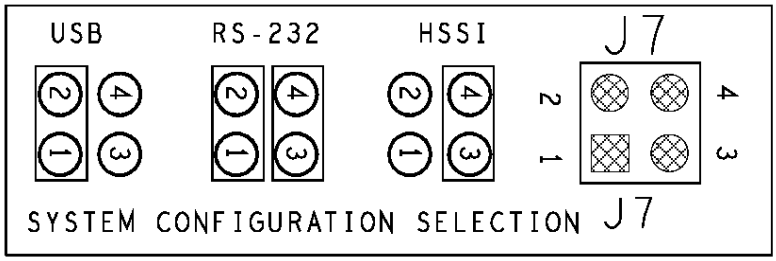


Figure 2-4 *Jumper Configurations for Host Communication*

Signal Breakout - Block 4

Block four (4) contains multiple jumper pads including J9, J19, J26, J27, J11, J17, J18, J14, and J21 shown in Figure 2-5. These jumpers provide test points for probing all logic signals to and from the engine. This block also functions as a break-out pad so jumpers can be removed and the signal between the engine and the host can be isolated and driven externally by another source.

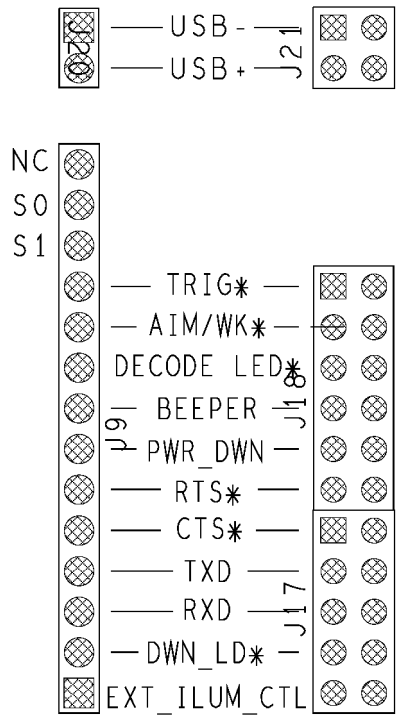


Figure 2-5 *Signal Breakout Jumpers*

The break out pads are the dual row headers J17, J18, J14, and J21 from left to right as they appear on the board and in Figure 2-5. The signals mapped to these headers are silk screened between these headers and the single row headers J9, J27, J26, J19, and J20. The single row headers are test points for probing, and are connected directly to the engine signals that propagate from J23/J4/J8. Install the jumpers on the dual row headers to connect these signals to the rest of the board including the board connectors, LEDs, and beeper. Remove the jumpers on the dual row headers to break this connection and access either node of the signal.

External Illumination Interface - Block 5 (SE4400/PL4407 and SE6700/PL6707)

If necessary, add an external illumination system which is controlled and powered from the UDK through connector J22, according to Table 2-3. Use header J28 to select either 3.0 V/3.3 V or 5 V to power the external illumination system, according to the jumper setting shown in Figure 2-6. When using the 3.0 V/3.3 V setting, the jumper settings on the Board Power Selection header J29 determine the illumination voltage.

Table 2-3 *External Illumination System Signals*

External Illumination System Signal	Connector pin
External Illumination Power	J22-1
Ext_Illum_Cntl	J22-2
Ground	J22-3

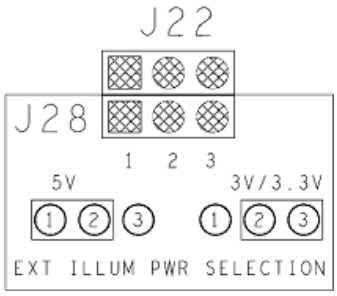


Figure 2-6 *Illumination System Jumper Settings*

Download Button - Block 6

S3, shown in Figure 2-7 controls the state of the download signal, J23 pin 30 and J4 pin 12. To place the device in download mode, press this button during a power cycle until the device beeps. In download mode, the device's bootloader communicates over the RS-232 connection through J6,

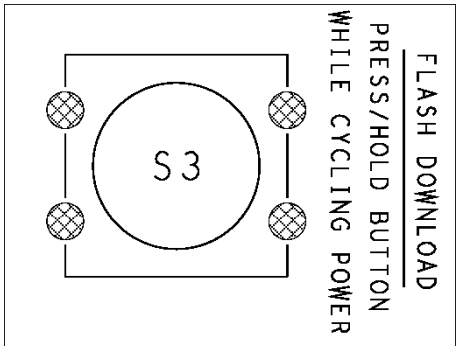


Figure 2-7 *Download Button*

RS-232 Circuitry - Block 7

The circuitry in block seven (7) shown in Figure 2-8 is composed of the RS-232 DB-9 connector (J6), a 1 Mbps RS-232 transceiver (U1), and four LEDs that provide visual status of the RTS, CTS, TXD, and RXD signals between the host and the engine.

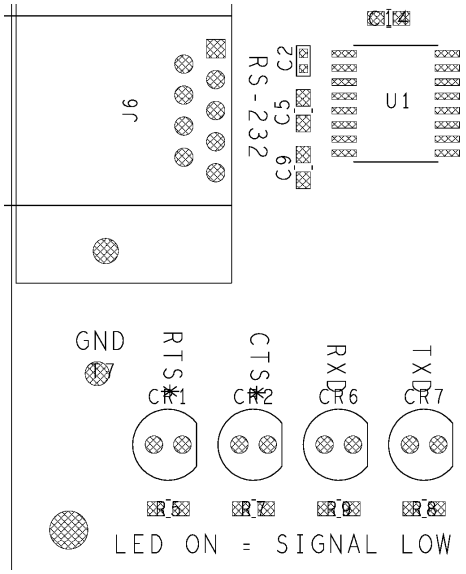


Figure 2-8 *RS-232 Subsystem Circuitry*

User Interface Circuitry - Block 8

Block eight (8) contains the Trigger button, Aim/Wake button, Decode LED and Power Down LED. Table 2-4 details each of these components.

Table 2-4 *Block Eight Components*

Component	Description
Trigger Button (S2)	This button controls the polarity of the trigger signal, J23 pin 19 and J4 pin 1, to the engine. When pressed it forces a trigger into the engine, starting a decode session. It also wakes the engine from low power mode.
Aim/Wake Button (S1)	This dual-purpose button drives the AIM/WAKE* signal J23 pin 20 and J4 pin 2, to the engine. When the engine is in low power mode, the button drives the wake signal into the engine to force it into normal power mode. If the engine is in normal power mode, the button drives the aim signal which turns on the aiming pattern when the engine is in the correct mode. Refer to the *PL4407 Integration Guide* for more details.
Power Down LED	This LED is tied to the PWRDWN* signal, J23 pin 23 and J4 pin 5. The engine illuminates this to indicate it is low power mode.
Decode LED	This LED is tied to the DLED* signal, J23 pin 19 and J4 pin 3. The engine illuminates this to indicate a good decode.

Engine Mounting Holes - Block 9

Block nine (9) contains the mounting holes for all supported data capture engines. Refer to the silk screen on the board for mounting hole instructions.

Appendix A Reference Schematic

UDK Reference Schematic

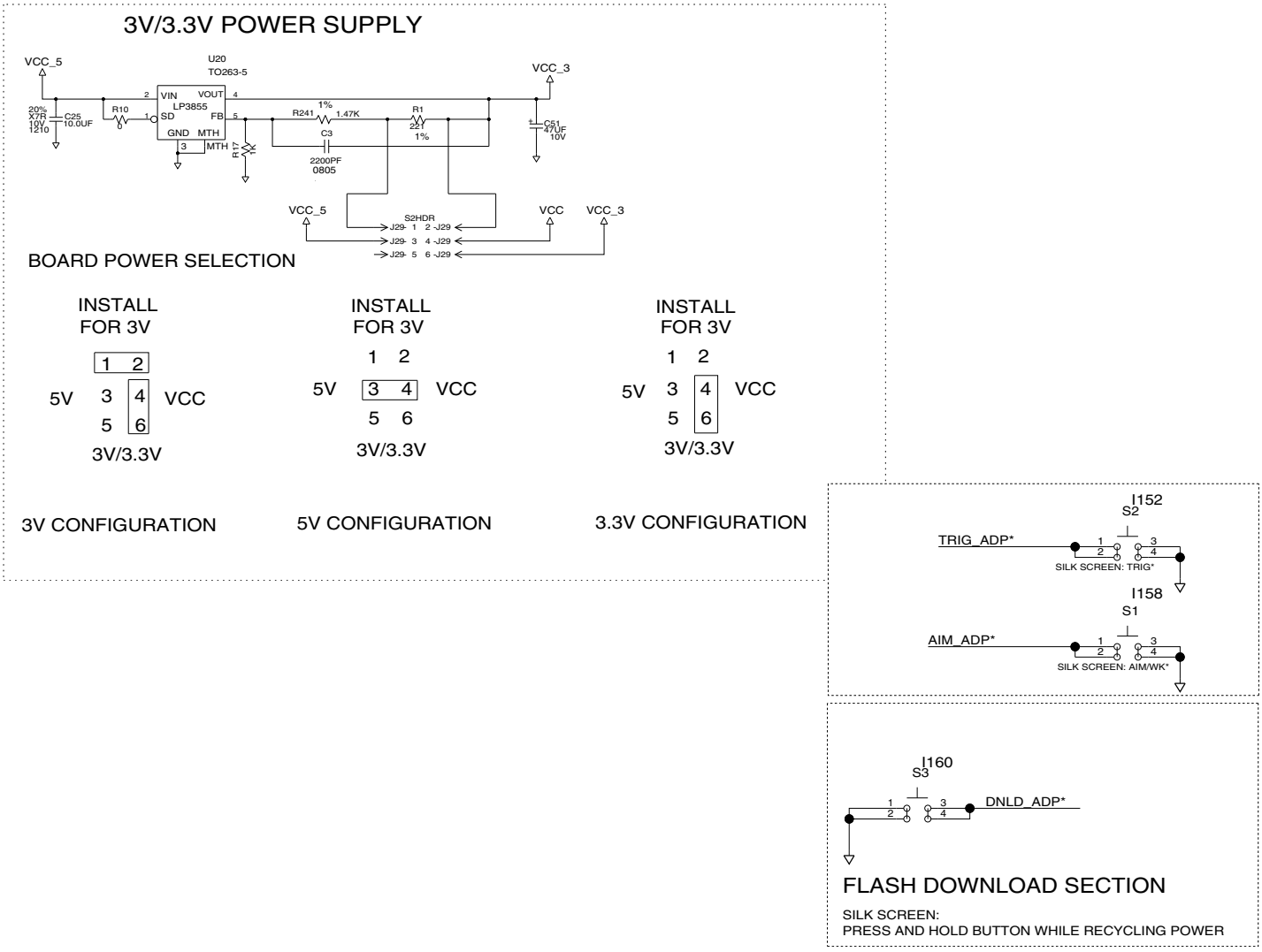


Figure A-1 *UDK Reference Schematic*

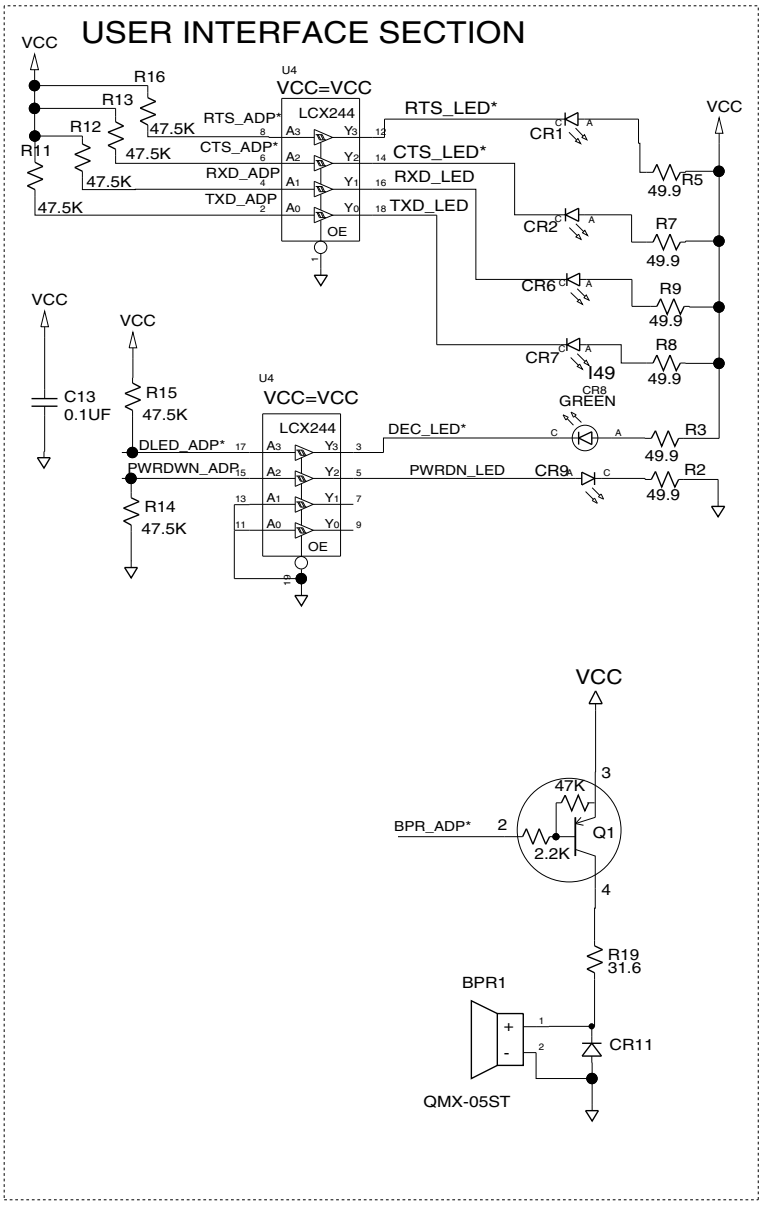


Figure A-2 *UDK Reference Schematic (continued)*

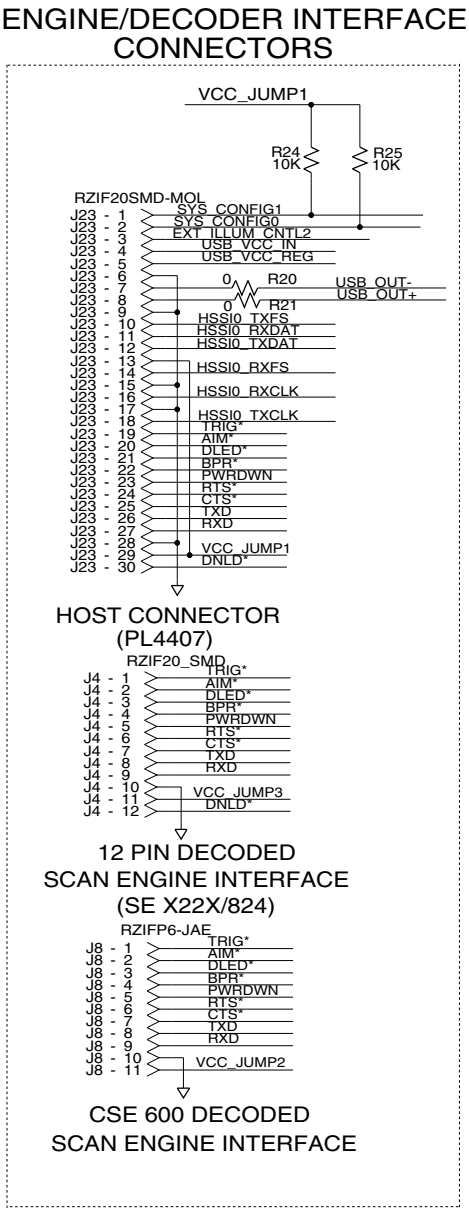
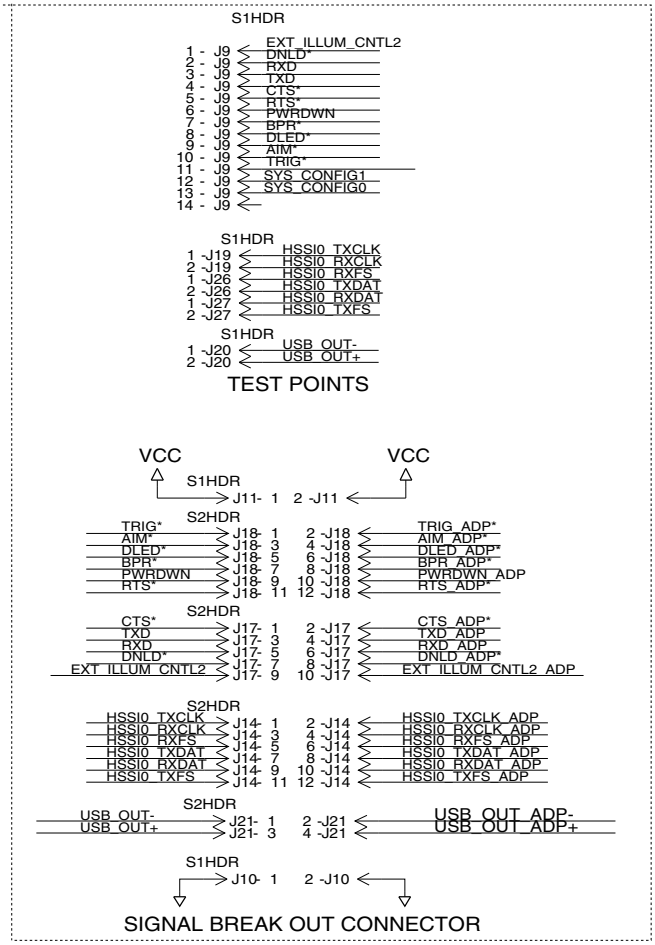
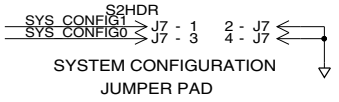


Figure A-3 *UDK Reference Schematic (continued)*





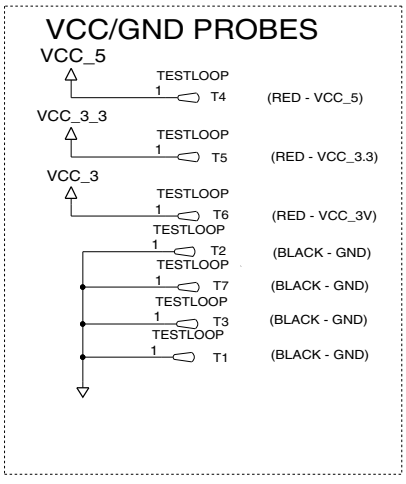


Figure A-4 *UDK Reference Schematic (continued)*

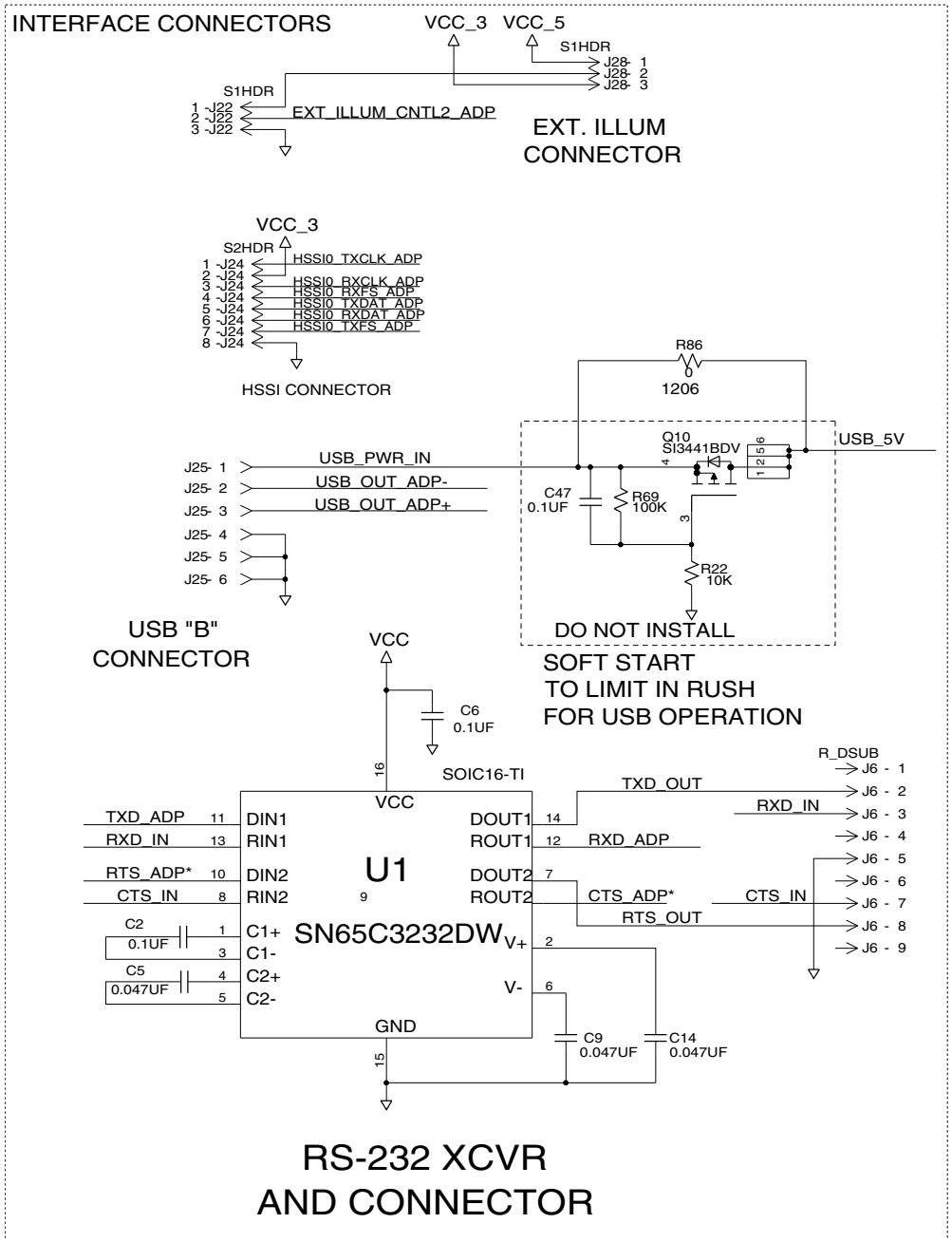
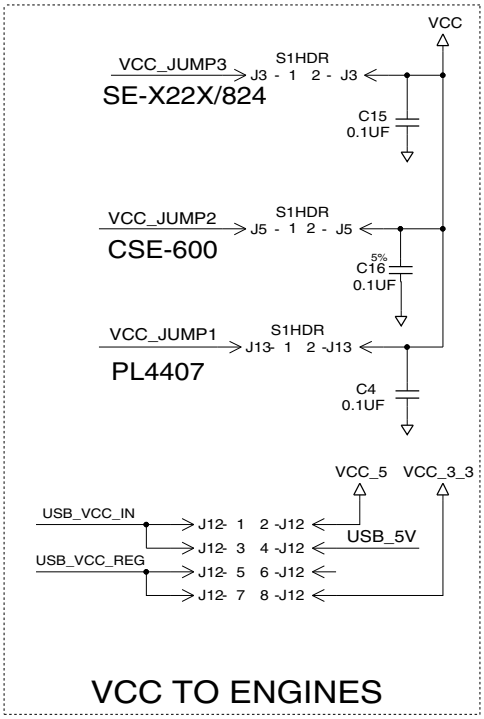


Figure A-5 *UDK Reference Schematic (continued)*



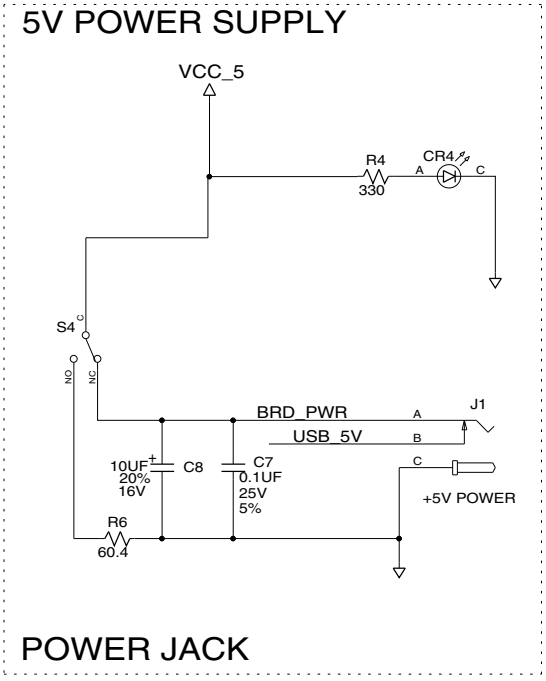


Figure A-6 *UDK Reference Schematic (continued)*

Index

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