TERIDIAN
SEMICONDUCTOR CORP.

Simplifying System Integration^{TM}

73M1966B
Demo Board User Manual

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1   Introduction

The 73M1966B Demo Board can be used with the 73M1966/1866 Demo Motherboard or in target applications where it is connected either by the appropriate connector or "blue wired" into the system that is will be used with. The active circuitry is identical to the 73M1866B Keychain Board other than including a connector for the GUI interface cable. The GUI cable is included in the 73M1966B Evaluation Kit and the Demo Board kit if it has been specifically ordered.

1.1   Package Contents
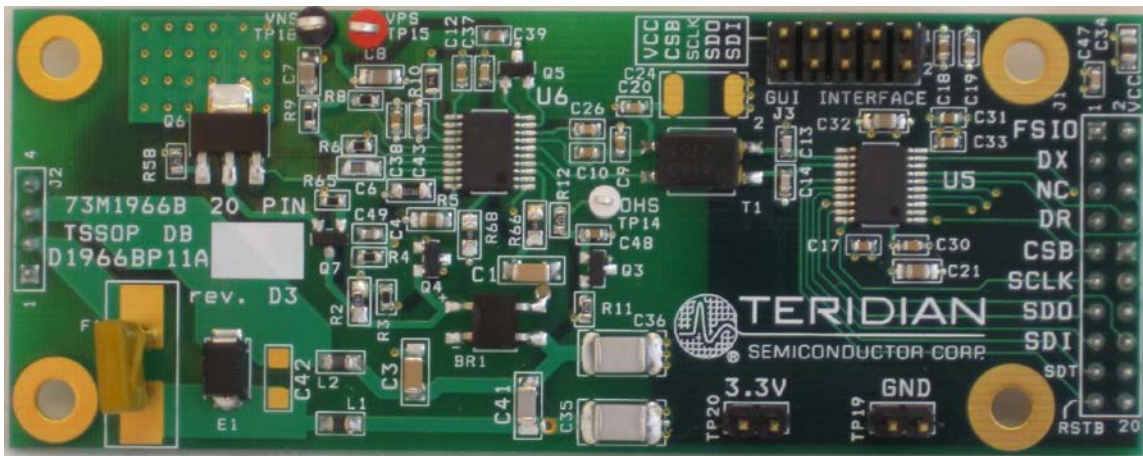
Figure 1: 73M1966B Demo Board

The 73M1966B Demo Board Kit includes:

- A 73M1966B Demo Board (Rev. D3)
- GUI Interface Cable (included with 73M1966B-EVM and 73M1966B-DB-C)
- The following documents on CD:
    - *73M1966B Demo Board User Manual* (this document)
    - *73M1866B/73M1966B Data Sheet*
    - *73M1966B GUI User Guide* (included with 73M1966B-EVM and 73M1966B-DB-C)
    - *73M1966 Layout Guidelines*
    - *73M1x66 Worldwide Design Guide*
    - *PCM Connectivity Application Note*

1.2   Safety and ESD Notes

Connecting live voltages to the 73M1966 Demo Board system will result in potentially hazardous voltages on the boards.

> **CAUTION**   **Extreme caution should be taken when handling the 73M1966B Demo Board after connection to live voltages!**

> **CAUTION**   **The 73M1966B Demo Board is ESD sensitive! ESD precautions should be taken when handling this board!**

2   Connectors

This section describes the 73M1966B Demo Board connectors. All the digital signals and power supply connections are made through a 20-pin header connector. The audio monitor is also brought out on this connector. Table 1 describes the pins for the J1 connector. For convenience, most digital signals are grouped with the PCM signals on the odd pins from pin 1 to pin 7, and the PCM CLKI pin is on pin 8. The SPI signals can be found on the odd pins 9 through 17. Reset is on pin 19. The interrupt output is on pin 16. There are two power pins on pins 2 and 4 and two ground pins on pins 18 and 20. The audio monitor output can be found on pin 10. There is also a CLKO pin that can be used for the rare case where the 73M1866B is used in the master mode.

Table 1: J1 Pin Descriptions

Pin	Pin Name	Function	Pin	Pin Name	Function
1	FSIO	PCM Bidirectional Frame Sync	2	VCC	3.3V power in
3	DX	PCM Receive Digital Data Output	4	VCC	3.3V power in
5	N/C	No Connect	6	CLKO	PCM Highway Clock Output
7	DR	PCM Transmit Digital Data Input	8	CLKI	PCM Highway Clock Input
9	CSB	Chip Select - low true	10	AUDIO	Audio output for speaker
11	SCLK	SPI Clock	12	N/C	No Connect
13	SDO	Serial Control Data Out	14	N/C	No Connect
15	SDI	Serial Control Data In	16	INTB	Interrupt Output - low true
17	SDT	Serial Data Thru – used in Daisy Chain Mode	18	GND	Ground
19	RSTB	Reset - low true	20	GND	Ground

Table 2 describes the J2 connector pins. These are the bi-directional PSTN network connections that pass the audio signals to and from the FXO.

Table 2: J2 Pin Descriptions

Pin	Name	Function
1	N/C	No Connect
2	TIP	Bidirectional Analog Signaling
3	RING	Bidirectional Analog Signaling
4	N/C	No Connect

The signals on the TIP and RING pins should also have a DC current that would normally come from the PSTN. This current will usually be in the range of 20 to 100 mA, but typically about 40 mA. This current is necessary for the FXO to operate normally. The FXO will not operate if the current drops below approximately 13 mA.

Table 5 describes the J3 connector pins. J3 is used to connect a host PC to the Demo Board to provide GUI control.

Table 3: J3 Pin Descriptions

Pin	Pin Name	Function	Pin	Pin Name	Function
1	SDI	Serial Control Data In	2	N/C	No Connect
3	SDO	Serial Control Data Out	4	GND	
5	SCLK	Serial Clock	6	GND	
7	CSB	Chip Select - low true	8	GND	
9	VCC		10	N/C	No Connect

3 Connecting the Demo Board into an Existing System

The 73M1966B Keychain Demo Board is designed to be easily connected to an existing system that has access to a PCM and SPI interface. Table 1 provides the pin and signal names. Further detail is provided in the *73M1866B/73M1966B Data Sheet*. If connectivity between the Keychain Demo Board and the system is provided by 'blue-wire', we recommend that 30 AWG wire be used as a minimum and that the maximum length of these wires should not exceed 8 inches (20 cm). It is also recommended that the ground have at least two 30 AWG wires connecting the 73M1966B Demo Board to the host board.

Once connected, the user should check for the integrity of appropriate clock and control signals. Ensure the signals have minimal over-shoot and under-shoot on the signal transitions. Consult the *73M1866B/1966B Data Sheet* for information on the signal timing and ensure the host SPI conforms to these requirements.

The 73M1966B Demo Board is also designed to plug into the 73M1966B EVM Motherboard. This board supports the connection of a PCM test device such as the Wandel and Goltermann PCM-4. See the *73M1966B-EVM User Manual* for more information.

In order for the 73M1966B Demo Board to operate correctly it needs to be configured by software. Teridian provided Reference Driver Software and Linux based Command Line application can be used to configure and control the 73M1966B. Contact Teridian Sales for more information on the available software.

If 73M1966B-DB-C has been provided, a cable is included that connects the GUI Interface J3 to a Windows PC with a parallel port. This, along with the GUI software, will allow a user to configure the 73M1966B without the need to provide any embedded software. Refer to the *73M1966B GUI User Guide* for more information on using the Teridian provided GUI software.

If a 73M1966B Motherboard Evaluation Kit (73M1966B-EVM) is being used, the 73M1966B Demo Board is inserted into the appropriate socket . For further details on operating this system, refer to the *73M1966B EVM User Manual*.

4   Connecting the Demo Board Directly to a PCM Test Set

The 73M1966B Demo Motherboard conveniently provides a power connector, a power switch, PCM interface connectors, and clock connectors. However, it is not necessary to utilize the Motherboard when evaluating the device set. In some applications, it might be better to directly connect the 73M1966B Demo Board to the PCM channel test set. Even without the Motherboard, the 73M1966B can be used with the GUI and a channel test set.

If only the 73M1966B Demo Board is used, the two-row J1 connector has all the necessary signals to connect to the digital signals of the channel test set and 3.3 V power as shown in Figure 2. Other PCM highway test sets should also require only the 73M1966B Demo Board to perform similar tests.
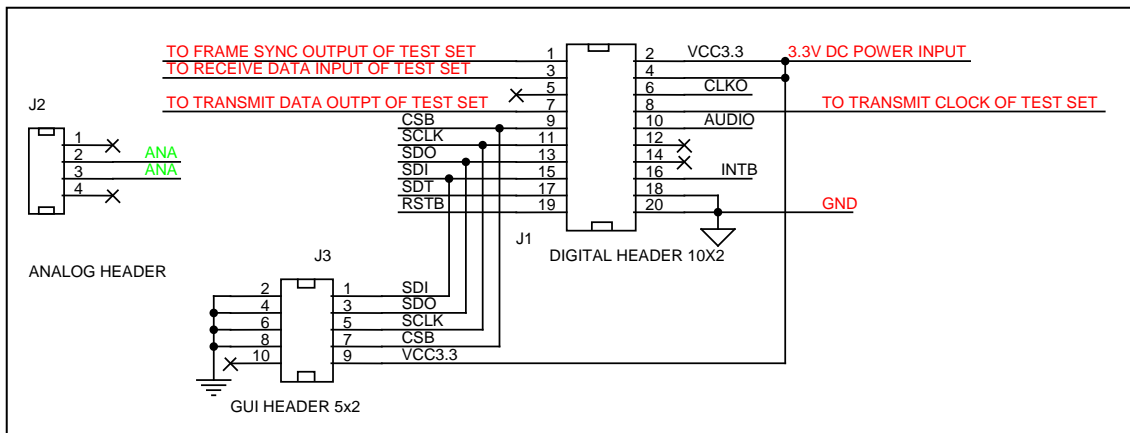

Figure 2: Connecting the 73M1966B Demo Board Directly to a PCM Test Set

5   73M1966B Demo Board Schematics, PCB Layouts and Bill of Materials

5.1   Schematics

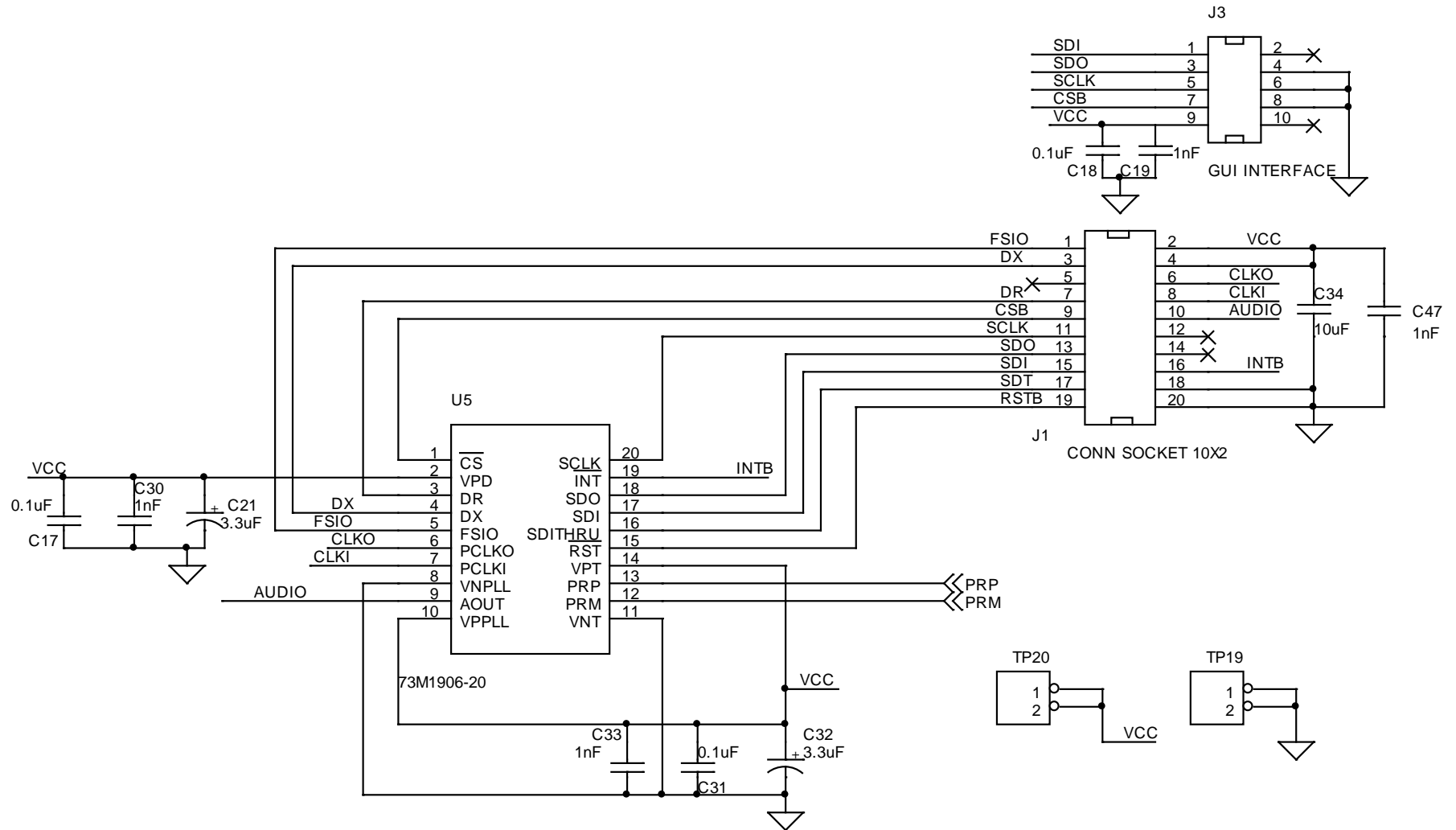**Figure 3 : 73M1966B 20-Pin TSSOP Demo Board Schematic Diagram Host Interface**
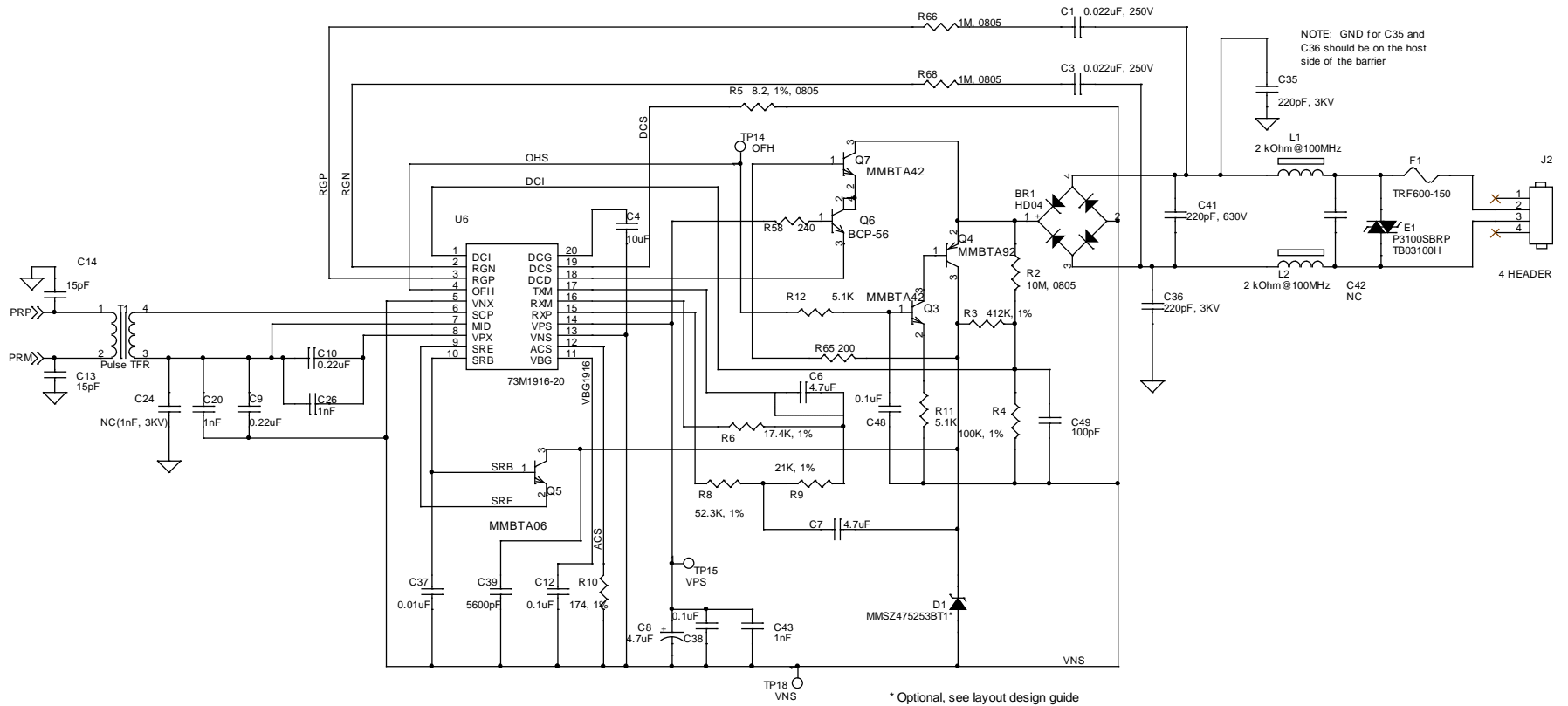
Figure 4 : 73M1966B 20-Pin TSSOP Demo Board Schematic Diagram Line Interface
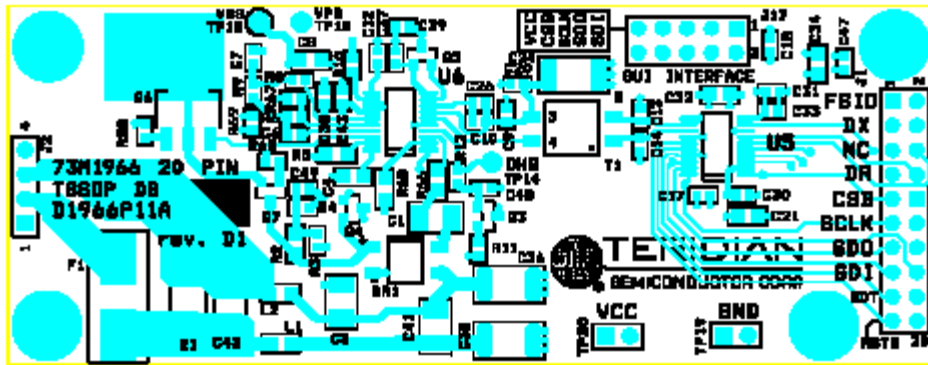
5.2   PCB Layouts

Figure 5: 73M1966B Demo Board Top Layer

Figure 6: 73M1966B Demo Board Bottom Layer

Figure 7 : 73M1966B 20-Pin TSSOP Demo Board: Ground Plane Layer
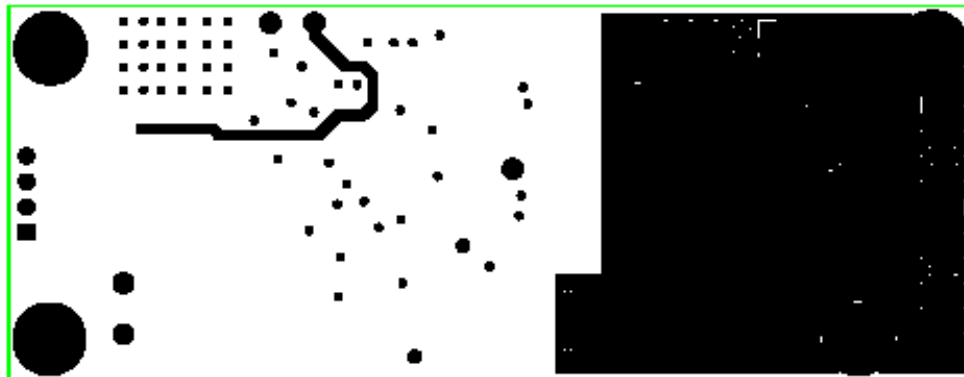
Figure 8 : 73M1966B 20-Pin TSSOP Demo Board: Power Plane Layer

5.3   Bill of Materials

Table 4 provides the bill of materials for the 73M1966B Demo Board schematic provided in Figure 3 and Figure 4.

Table 4: 73M1966B Demo Board Bill of Materials

Qty	Reference	Part Description	Source	Example MFR P/N
1	BR1	HD04 rectifier bridge, 0.8A, 400V	Diodes Inc.	HD04-T
2	C1, C3	0.022µF, 250V	TDK	C3216X7R2E223K
2	C4, C34	10 µF	AVX, Panasonic	TCP0J106M8RA
3	C6, C7, C8	4.7µF 25V, X5R, 0805	AVX, Panasonic	08053D475KAT2A
2	C9, C10	0.22µF 16V, X7R, ceramic, 0603	Panasonic	C0603C224K8RACTU
6	C12, C17,C18, C31, C38, C48	0.1µF 16V, X7R, ceramic, 0603	Panasonic, Kemet	C0603C104K8RACTU
2	C13, C14	15pF 50V, ceramic, 0603	Panasonic	ECJ-1VC1H150J
7	C19, C20, C26, C30, C33, C43, C47	1nF 10V, X7R, ceramic, 0603	Panasonic	C0603C102K8RACTU
2	C21, C32	3.3µF 6.3V, tantalum, 0805	Rohm	TCP0J335M8R
2	C35, C36	220pF, 3KV	Kemet	C1812C102KHRACTU
2	C37, C39	0.01µF 50V, X7R, ceramic, 0603	AVX, Panasonic	06035C103KAT2A
1	C41	220pF, 630V	TDK	C3216COG2J221J
1	C49	100pF	Panasonic	ECJ-1CV1H101J
1	E1	P3100SBRP	Teccor	P3100SBLRP
1	F1	TRF600-150	Raychem	TRF600-150
1	J1	Header	Sullins	10 X 2
1	J2	Header	Sullins	4 X 1
1	J3	Header	Sullins	5 X 2
2	L1, L2	2000 Ohm	TDK	MPZ2012S601A
1	Q5	MMBTA06, NPN 80 V transistor SOT23	Diodes, Fairchild, Central, On Semi	MMBTA06LT1G
1	Q4	MMBTA92, PNP 300 V transistor SOT23	Diodes, Fairchild, Central, On Semi	MMBTA92LT1G
2	Q3, Q7	MMBTA42, NPN 300 V transistor SOT23	Diodes, Fairchild, Central, On Semi	MMBTA42LT1G
1	Q6	NPN 80 V transistor SOT223	Fairchild, On Semi	BCP56
1	R2	10M, 5%, 1/8W resistor 0805	Yageo	RC0805JR-0710ML
1	R3	412K, 1%, 1/10W resistor 0603	Yageo	RC0603FR-07412KL
1	R4	100K, 1%, 1/10W resistor 0603	Yageo	RC0603FR-07100KL
1	R5	8.2, 5%, 1/8W resistor 0805	Yageo	RC0805JR-078R2L
1	R6	17.4K, 1%, 1/10W resistor 0603	Yageo	RC0603FR-0717K4L
1	R8	52.3K, 1%, 1/10W resistor 0603	Yageo	RC0603FR-0752K3L
1	R9	21K, 1%, 1/10W resistor 0603	Yageo	RC0603FR-0721KL
1	R10	174, 1%, 1/10W resistor 0603	Yageo	RC0603FR-07174RL
1	R11	3K, 5%, 1/10W resistor 0603	Yageo	RC0603JR-073K0L
1	R12	5.1 K, 5%, 1/10W resistor 0603	Yageo	RC0603JR-075K1L
1	R58	240, 5%, 1/10W resistor 0603	Yageo	RC0603JR-07240RL
1	R65	200, 5%, 1/10W resistor 0603	Yageo	RC0603JR-07200RL
2	R66, R68	1 M, 5%, 1/8W resistor 0805	Yageo	RC0603JR-071ML
1	T1	Pulse transformer	UMEC, Sumida, Midcom	UBT0154, ESMIT 4180, 750110001

6   Ordering Information

Table 5 lists the order numbers and packaging marks used to identify 73M1966B and 73M1866B Demo Boards.

Table 5: Order Numbers and Packaging Marks

Part Description	Order Number	Packaging Mark
73M1966B 20-Pin TSSOP Motherboard and Standard Demo Board	73M1966B-EVM	73M1916-M 73M1906B
73M1966B 20-Pin TSSOP Demo Board	73M1966B-DB	73M1966B-IM
73M1966B 20-Pin TSSOP Demo Board with GUI cable	73M1966B-DB-C	73M1966B-IM
73M1866B 20-Pin TSSOP Keychain Demo Board	73M1866B-Keychain	

7   Related Documentation

The following 73M1x66B documents are available from Teridian Semiconductor Corporation:

73M1866B/73M1966B Data Sheet
73M1866B/73M1966B Layout Guidelines
73M1x66 Worldwide Design Guide
73M1x66 PCM Connectivity Application Note
73M1966B-EVM User Manual
73M1966B GUI User Guide
73M1866B/73M1966B FXOCTL Application User Guide

8   Contact Information

For more information about Teridian Semiconductor products or to check the availability of the 73M1966B, contact us at:

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For a complete list of worldwide sales offices, go to http://www.teridian.com.

Revision History

Revision	Date	Description
1.0	11/21/2008	First publication.
1.1	9/14/2009	Added Section 4, Connecting the Demo Board Directly to a PCM Test Set. Re-ordered sections.
1.2	1/22/2010	In Figure 4, added a Zener diode to the schematic.