

Reference Power-Load CableCARD™ Specification

OC-SP-RPLCC-I01-040621

ISSUED

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Document Status Sheet

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Work in Progress	An incomplete document, designed to guide discussion and generate feedback, that may include several alternative requirements for consideration.
Draft	A document in specification format considered largely complete, but lacking review by Members and vendors. Drafts are susceptible to substantial change during the review process.
Issued	A stable document, which has undergone rigorous member and vendor review and is suitable for product design and development, cross-vendor interoperability, and for certification testing.
Closed	A static document, reviewed, tested, validated, and closed to further engineering change requests to the specification through CableLabs.

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Contents

1 SCOPE 1

1.1 Introduction and Overview 1

1.2 Purpose of document 1

1.3 Requirements 1

2 REFERENCES 2

2.1 Informative References..... 2

2.2 Reference Acquisition 2

3 ABBREVIATIONS AND ACRONYMS 2

4 TEXT OF SPECIFICATION..... 3

4.1 Circuit Design 3

4.2 Physical Construction 5

Figures

Figure 1. Reference Power Load Circuit..... 4

Figure 2. Physical placement of load resistors..... 6

Figure 3. Top plating layout..... 7

Figure 4. Assembly layout..... 8

Figure 5. Bottom layout..... 9

Figure 6. Top layout..... 10

Figure 7. Silk 11

1 SCOPE

1.1 Introduction and Overview

At the request of Consumer Electronics Association and Cable Operators, CableLabs has developed a specification for the CableCARD reference power load used to test the requirement that Unidirectional Receiving Devices and OpenCable Host Devices can sufficiently dissipate the heat from a CableCARD when the CableCARD is drawing a continuous 2.5 watt power load.

1.2 Purpose of document

The purpose of this document is to provide Consumer Electronic Manufacturers with the option of building their own CableCARD reference power load for testing. Unidirectional Receiving Devices and OpenCable Host Devices built to the requirements of this specification will be able to dissipate the heat generated by the CableCARD when running over a period of time.

1.3 Requirements

Throughout this document, the words that are used to define the significance of particular requirements are capitalized. These words are:

“SHALL”/ “MUST”	This word or the adjective “REQUIRED” means that the item is an absolute requirement of this specification.
“SHALL NOT”/ “MUST NOT”	This phrase means that the item is an absolute prohibition of this specification.
“SHOULD”	This word or the adjective “RECOMMENDED” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
“SHOULD NOT”	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
“MAY”	This word or the adjective “OPTIONAL” means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

2 REFERENCES

2.1 Informative References

- [1] SCTE 28 2004 HOST-POD Interface Standard, <http://www.scte.org/documents/pdf/SCTE282004.pdf>.
- [2] Uni-Directional Receiving Device Conformance Checklist: PICS Proforma Uni-Dir-PICS-I01-030903, September 9, 2003, <http://www.cablelabs.com/udcp/downloads/PICS-I01-030903.pdf>
- [3] OpenCable™ Host Device Core Functional Requirements, OC-SP-HOST-CFR-I16-040402, April 04, 2004, <http://www.opencable.com/downloads/specs/OC-SP-HOST-CFR-I16-040402.pdf>
- [4] PCMCIA PC Card Standard Volume 2 Release 8.0, April 2001 Electrical Specification

2.2 Reference Acquisition

CableLabs Specifications:

Cable Television Laboratories, Inc., 858 Coal Creek Circle, Louisville, CO 80027;
Phone: 303-661-9100; Fax 303-661-9199; <http://www.cablelabs.com/>.

SCTE/DVS Standards:

SCTE - Society of Cable Telecommunications Engineers Inc., 140 Philips Road, Exton, PA 19341
Phone: 610-363-6888 / 800-542-5040; Fax: 610-363-5898; <http://www.scte.org/>.

ISO/IEC Specifications:

ISO Central Secretariat: International Organization for Standardization (ISO), 1, rue de Varembe, Case postale 56, CH-1211 Geneva 20, Switzerland; Internet: <http://www.iso.ch/>

3 ABBREVIATIONS AND ACRONYMS

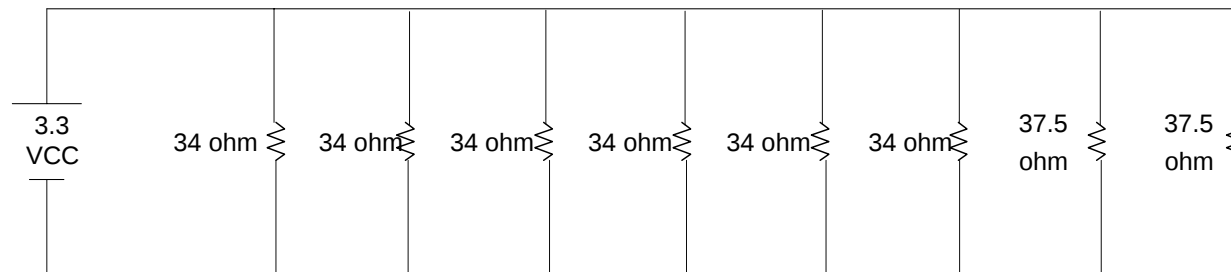
This specification uses the following abbreviations:

CableCARD	A CableCARD™ device, also referred to as “Point of Deployment” (POD) module, is a detachable device distributed by cable providers that connects to the home receiver. The interface between the CableCARD device and the receiver is specified by the OpenCable platform. CableCARD functionality includes copy protection and signal demodulation.
Cable Device	A cable receiver that is compliant with any of the hardware profiles defined by the OpenCable HOST-CFR specification [1] or the Uni-Dir-PICS document [2].

4 TEXT OF SPECIFICATION

4.1 Circuit Design

Based on the information provided by the combined heat signature of all three available CableCARDS currently available from Motorola, Scientific Atlanta and NDS, the following the circuit design has been determined to best emulate a fully powered CableCARD. This circuit design will place a power load into eight parallel load resistors that make up the CableCARD reference power load that can be strategically placed on a double-sided circuit board to better emulate the heat signature of a fully powered CableCARD. The first six load resistors SHALL be 34 ohms, the last two resistors SHALL be 37.5 ohms all placed in a parallel circuit, which will provide a total resistive load of 4.35 ohms. Using Ohm's law, a 4.35-ohm resistive load with a VCC of 3.3 V will produce a desired power load CableCARD that continually draws an average of 2.5 watts. The CableCARD reference power load will satisfy the need to test that a Cable Device can sufficiently dissipate a 2.5 watt power load from an actual CableCARD, without exceeding the specified heat requirement. No non-consumer-accessible surface point SHALL be hotter than 65°C in a room where the ambient temperature is 40°C.



6 pair of 68 ohm resistors and 2 pair of 75 ohm resistors in parallel = 4.35 ohms total resistive load

VCC = 3.3V

Resistive (t) = 4.35 ohms

Amp (t) = 758.62 mA

Power(t)= 2.50 watts

Figure 1. Reference Power Load Circuit

4.2 Physical Construction

In order to provide the necessary current (758.62mA) to drive the recommended circuit, both VCC1 (pin 17) and VCC2 (pin 51) should be tied together to share the load. It is preferred to have a common ground, use all ground pins (pins 1, 34, 35 and 68) together as the common return ground. The possibility exists where a Cable Device may be designed in such a way that an “error” is generated, when VCC is outputting maximum current without a card detect on the PCMCIA interface, (possibly turning VCC off). To ensure that the CableCARD reference power load can set a valid card detect, CD1# (pin 36) and CD2# (pin 67) should be shorted to ground (pins 1, 34, 35 and 68) to provide a valid Card detect to the Cable Device. All other pins defined in SCTE 28 2004 [1] Table 6.1-A PC Card Signal Definitions should be left open or terminated at the PCMCIA connector.

Changing the card detect pin connections in accordance with SCTE 28 2004 [1] and Table 3-1 Card Detect and Voltage Sense Connections of Volume 2 Electrical Specification, PC Card Standard, version 8.0 [4], will produce versions of the “CableCARD Reference Power Load”. This includes changing the resistor values to match specified voltages and power requirements.

The physical construction of the reference power load should consist of the following:

- Metal can
- Double sided circuit board
- Common ground plane (pins 1, 34, 35 and 68)
- Surface mount resistors with 1/2 watt continuous rating
- Plastic labels on both top and bottom of can
- PCMCIA connector
- Type 2
- With the following physical placement of load resistors (see Figures 2 through 7 on the following pages)

NOTE: If the Host has separate power supplies for VCC1 and VCC2, it is recommended that 4 resistors be connected to each VCC pin. The equivalent resistor value should be the same across each VCC.

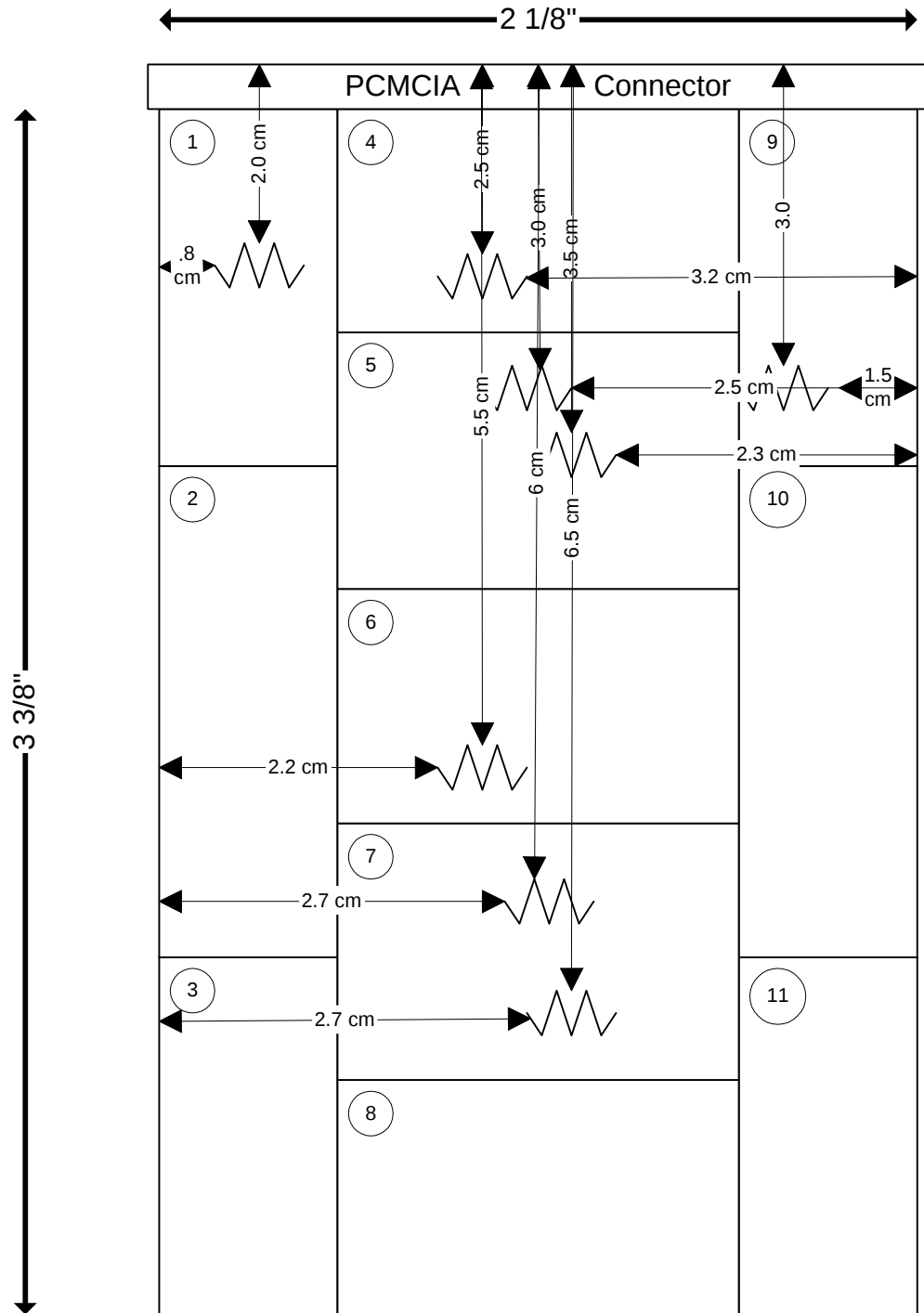


Figure 2. Physical placement of load resistors

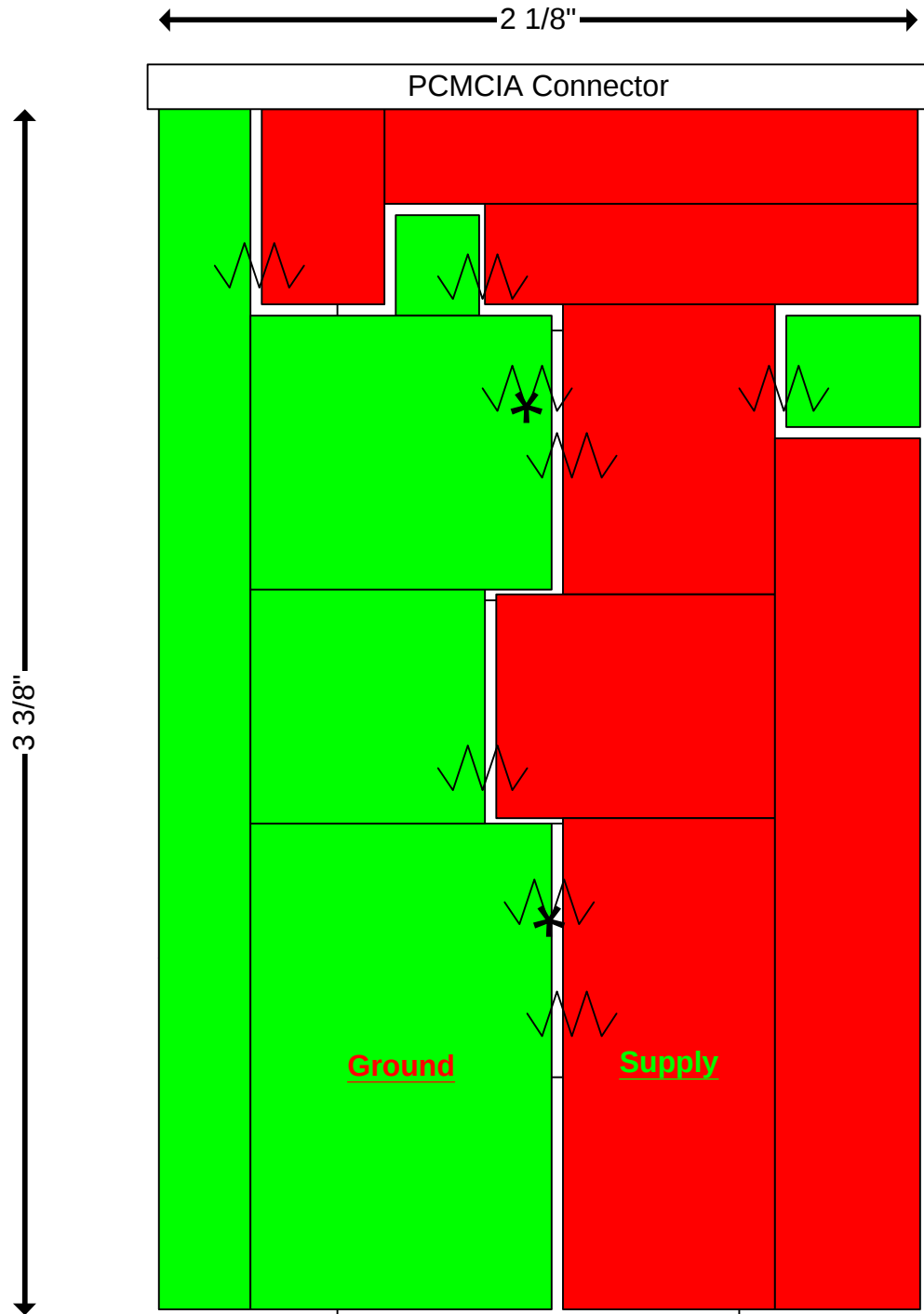


Figure 3. Top plating layout

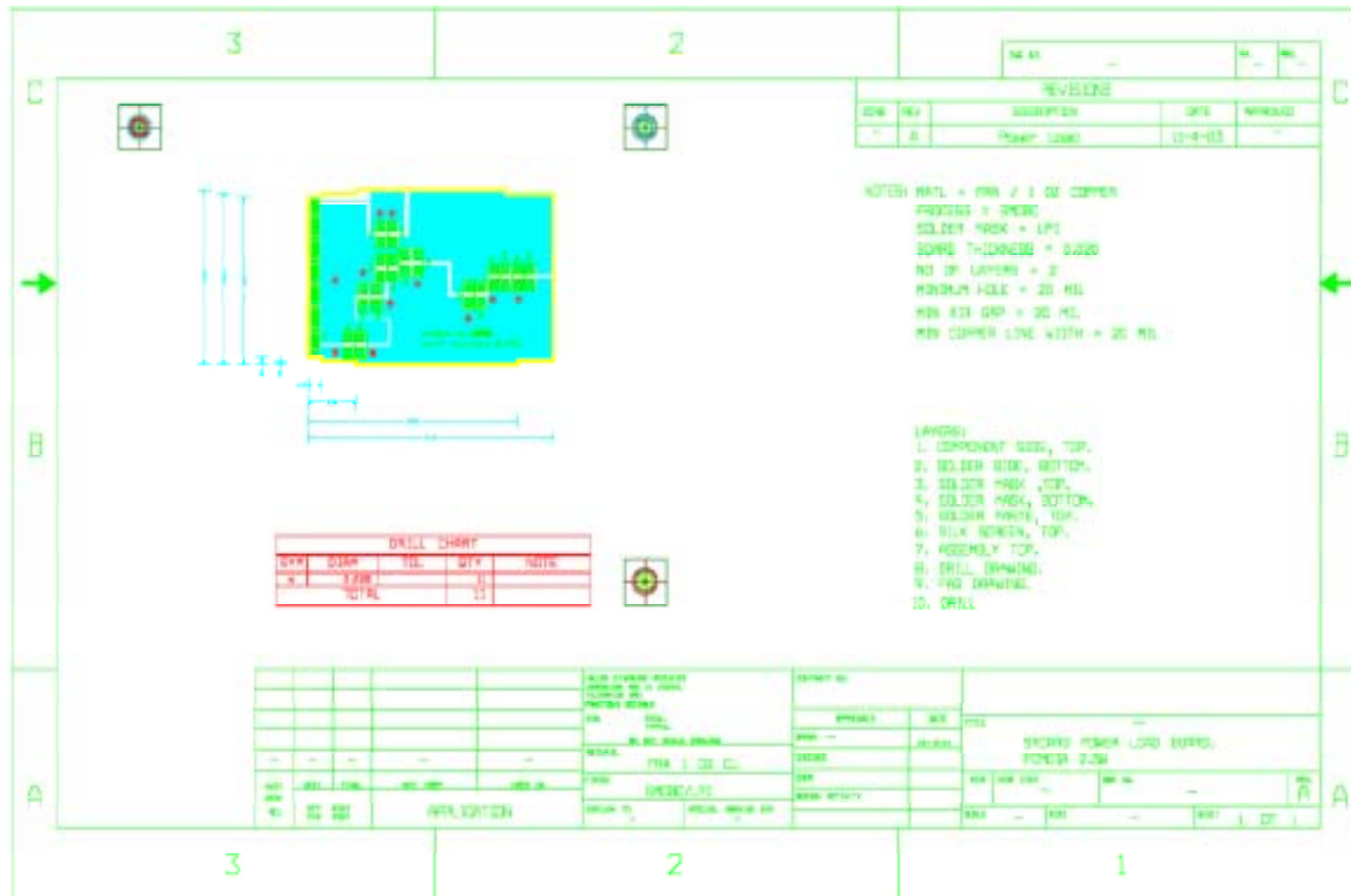


Figure 4. Assembly layout

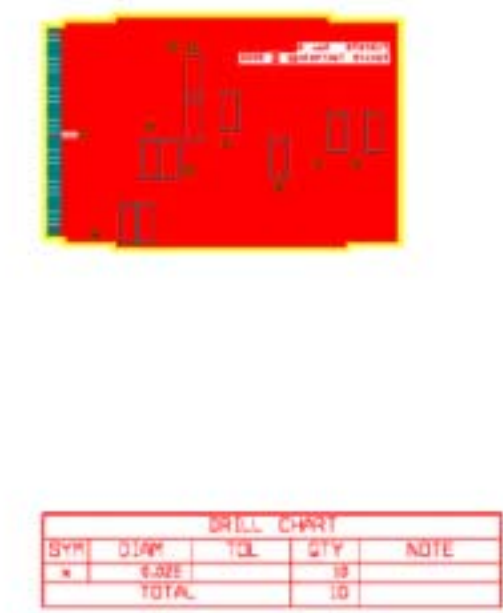


Figure 5. Bottom layout

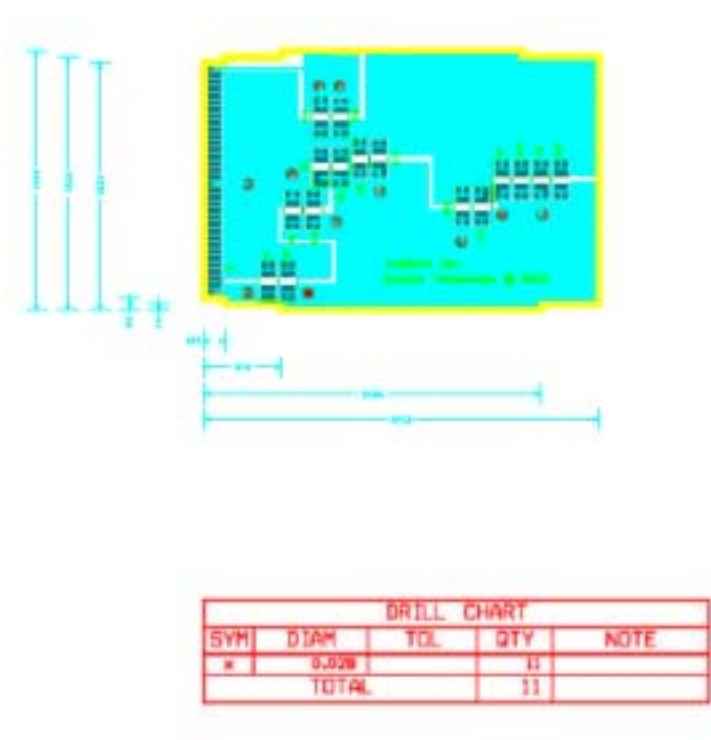


Figure 6. Top layout

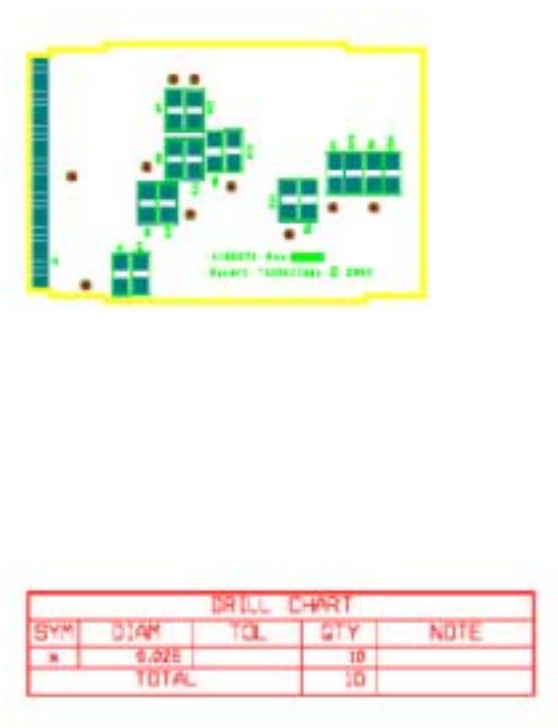


Figure 7. Silk