SFF specifications are available at http://www.snia.org/sff/specifications
or ftp://ftp.seagate.com/sff

This specification was developed by the SFF Committee prior to it becoming the SFF TA (Technology Affiliate) TWG (Technical Working Group) of SNIA (Storage Networking Industry Association).

The information below should be used instead of the equivalent herein.

POINTS OF CONTACT:

Chairman SFF TA TWG
Email: SFF-Chair@snia.org

If you are interested in participating in the activities of the SFF TWG, the membership application can be found at:
http://www.snia.org/sff/join

The complete list of SFF Specifications which have been completed or are currently being worked on can be found at:
http://www.snia.org/sff/specifications/SFF-8000.TXT

The operations which complement the SNIA's TWG Policies & Procedures to guide the SFF TWG can be found at:
http://www.snia.org/sff/specifications/SFF-8032.PDF

Suggestions for improvement of this specification will be welcome, they should be submitted to:
http://www.snia.org/feedback

SFF Committee documentation may be purchased in electronic form.
SFF specifications are available at ftp://ftp.seagate.com/sff

SFF Committee

SFF-8784

Specification for

0.8mm Card Edge Drive Connector

Rev 0.2 February 26, 2013

Secretariat: SFF Committee

Abstract: This specification defines the physical interface and general performance requirements of the mating interface for a 0.8mm card edge connector for use in disk drive applications.

This specification provides a common reference for systems manufacturers, system integrators, and suppliers. This is an internal working specification of the SFF Committee, an industry ad hoc group.

This specification is made available for public review, and written comments are solicited from readers. Comments received by the members will be considered for inclusion in future revisions of this specification.

The description of a connector in this specification does not assure that the specific component is actually available from connector suppliers. If such a connector is supplied it must comply with this specification to achieve interoperability between suppliers.

Support: This specification is supported by the identified member companies of the SFF Committee.

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EXPRESSION OF SUPPORT BY MANUFACTURERS

The following member companies of the SFF Committee voted in favor of this industry specification.

EMC
HGST
IBM
LSI
Sandisk
TE Connectivity
Western Digital

The following member companies of the SFF Committee voted against this industry specification.

Seagate

The following member companies of the SFF Committee voted to abstain on this industry specification.

Amphenol
FCI
Finisar
Foxconn
Hewlett Packard
JDS Uniphase
Molex
Oclaro
Sumitomo
Toshiba
Xyratex

Update History:

Rev 0.2 Expanded content removed from SFF-8252 Rev 0.2 into a connector specification.

Foreword

The development work on this specification was done by the SFF Committee, an industry group. The membership of the committee since its formation in August 1990 has included a mix of companies which are leaders across the industry.

When 2 1/2" diameter disk drives were introduced, there was no commonality on external dimensions e.g. physical size, mounting locations, connector type, connector location, between vendors.

The first use of these disk drives was in specific applications such as laptop portable computers and system integrators worked individually with vendors to develop the packaging. The result was wide diversity, and incompatibility.

The problems faced by integrators, device suppliers, and component suppliers led to the formation of the SFF Committee as an industry ad hoc group to address the marketing and engineering considerations of the emerging new technology.

During the development of the form factor definitions, other activities were suggested because participants in the SFF Committee faced more problems than the physical form factors of disk drives. In November 1992, the charter was expanded to address any issues of general interest and concern to the storage industry. The SFF Committee became a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

Those companies which have agreed to support a specification are identified in the first pages of each SFF Specification. Industry consensus is not an essential requirement to publish an SFF Specification because it is recognized that in an emerging product area, there is room for more than one approach. By making the documentation on competing proposals available, an integrator can examine the alternatives available and select the product that is felt to be most suitable.

SFF Committee meetings are held during T10 weeks (see www.t10.org), and Specific Subject Working Groups are held at the convenience of the participants. Material presented at SFF Committee meetings becomes public domain, and there are no restrictions on the open mailing of material presented at committee meetings.

Most of the specifications developed by the SFF Committee have either been incorporated into standards or adopted as standards by EIA (Electronic Industries Association), ANSI (American National Standards Institute) and IEC (International Electrotechnical Commission).

If you are interested in participating or wish to follow the activities of the SFF Committee, the signup for membership and/or documentation can be found at:
www.sffcommittee.com/ie/join.html

The complete list of SFF Specifications which have been completed or are currently being worked on by the SFF Committee can be found at:
ftp://ftp.seagate.com/sff/SFF-8000.TXT

If you wish to know more about the SFF Committee, the principles which guide the activities can be found at:
ftp://ftp.seagate.com/sff/SFF-8032.TXT

Suggestions for improvement of this specification will be welcome. They should be sent to the SFF Committee, 14426 Black Walnut Ct, Saratoga, CA 95070.

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SFF Committee --

0.8mm Card Edge Drive Connector

1. Scope

This specification defines the terminology and physical requirements for the mating interface and physical characteristics of the 0.8 mm card edge connector to support disk drives. The dimensions specified apply to connectors with 20 contacts.

The using interfaces define requirements on the characteristic impedance and ability to transmit multi-gigabit signals. When this connector is used on a disk drive, it is subject to the requirements of the application.

This specification is based on the characteristics of the 0.8mm connectors which have found wide acceptance in Ethernet and Fibre Channel applications.

2. References

2.1 Industry Documents

The following standards are relevant to many SFF Specifications.

- ANSI-Y14.5M Dimension and Tolerancing
- EIA 364-06 Contact Resistance Test Procedure For Electrical Connectors
- EIA 364-09 Durability Test Procedure For Electrical Connectors And Contacts
- EIA 364-13 Mating And Unmating Forces Test Procedures For Electrical Connectors
- EIA 364-21 Insulation Resistance Test Procedure For Electrical Connectors Sockets And Coaxial Contacts
- EIA-966 Serial Attachment 3 Gbs 2x Unshielded Connector (nee SFF-8482)
- SFF-8252 2.5” Form Factor Drive w/SFF-8784 Connector
- T10/2212-D Serial Attached SCSI – SAS 3
- SFF-8071 SFP+ 1X 0.8mm Card Edge Connector

Additional information concerning Serial ATA may be found at www.serialata.org.

2.2 SFF Specifications

There are several projects active within the SFF Committee. The complete list of specifications which have been completed or are still being worked on are listed in the specification at ftp://ftp.seagate.com/sff/SFF-8000.TXT

2.3 Sources

Those who join the SFF Committee as an Observer or Member receive electronic copies of the minutes and SFF specifications (http://www.sffcommittee.com/ie/join.html).

Copies of ANSI standards may be purchased from the InterNational Committee for Information Technology Standards (http://www.techstreet.com/incitsgate.tmpl).

2.4 Conventions

The dimensioning conventions are described in ANSI-Y14.5M, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters, which are the controlling dimensional units (if inches are supplied, they are for guidance only).

The ISO convention of numbering is used i.e., the thousands and higher multiples

are separated by a space and a period is used as the decimal point. This is equivalent to the English/American convention of a comma and a period.

American	French	ISO
0.6	0,6	0.6
1,000	1 000	1 000
1,323,462.9	1 323 462,9	1 323 462.9

3. General Description

The 0.8 mm connection system is based on industry-proven card edge style contacts, which mate with a single wipe.

0.8 mm Card Edge connectors find their most important application where signals have rise times typically in the range of 25 ps, where positive retention is needed, and ease of insertion/removal is also desired.

Design goals were the minimization of crosstalk and minimum transmission line impedance discontinuity across the connector interface at the desired signaling rates on the upper row of contacts. The lower row of contacts is rated at signaling rates up to 2.5 Gb/s.

A cage or latching device (not shown or part of this specification) is required to guide the connector, provide sufficient wipe on the contact interface, provide a hard stop which prevents bottoming, and keeps the card contacts on the connector contacts during use.

This specification includes the minimum lengths, widths and positional tolerances of the contacts.

4. Electrical Specifications

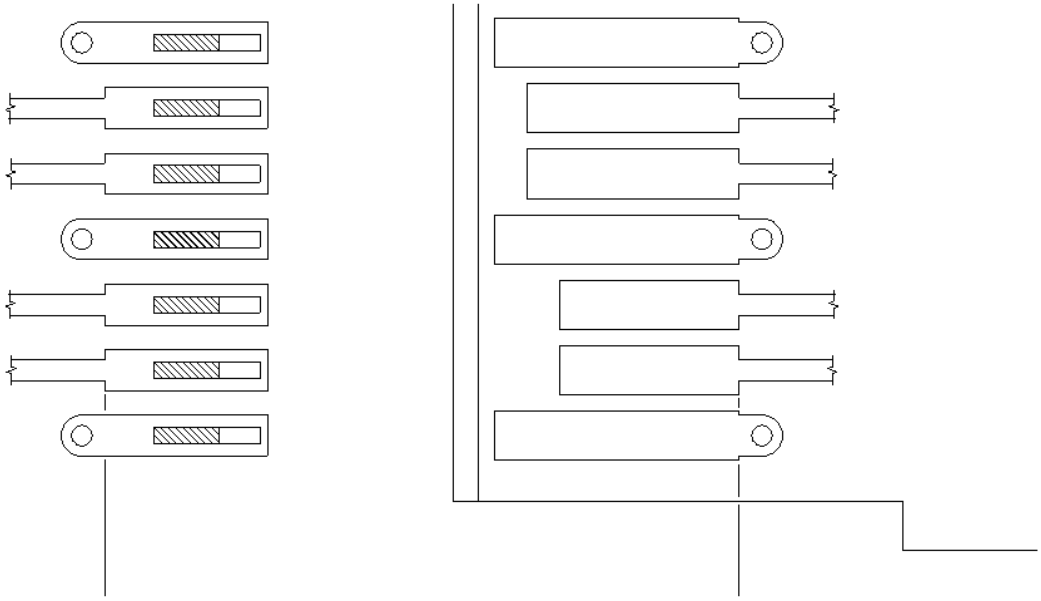
4.1 Electrical Requirements

TABLE 4-1 ELECTRICAL SPECIFICATIONS AND TEST CONDITIONS

Parameter	Specifications	Test Conditions
Temperature		-20C to +85C degrees
Humidity		80% RH Maximum
Current	0.5 A/contact	
Voltage	30 V AC/contact	
Low Level Contact Resistance	20 milliohms maximum for signal contacts (initial)	EIA 364-6: 320 mV DC, 10 mA
Insulation Resistance	1e3 MegaOhm Minimum between adjacent contacts	EIA 364-21: 100 V DC
Dielectric withstanding voltage	No defect between adjacent contacts	300 V DC for 1 minute hold

4.2 High Frequency Performance Requirements

For better performance it is recommended that grounds are cleared from underneath signal pads.



Host Board Side Footprint
De-embedding reference plane at end of contact pads.

Paddle Card Side Contact
De-embedding reference plane at end of contact pads.

FIGURE 4-1 DE-EMBEDDING REFERENCE PLANE

5. Mechanical Specifications

5.1 Datums

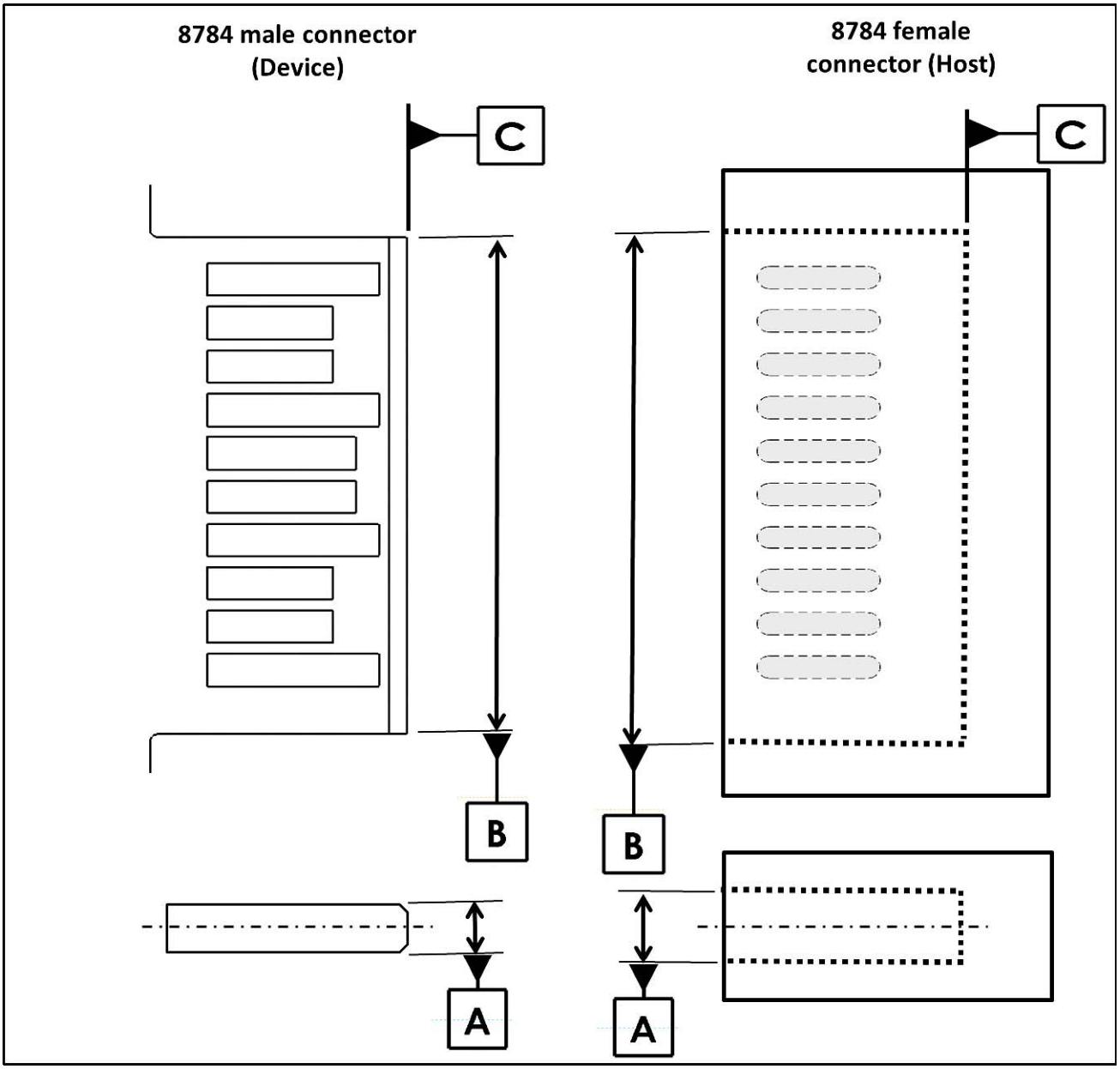


FIGURE 5-1 EXAMPLE OF DATUMS

TABLE 5-1 DEFINITION OF DATUMS

Datum	Description
A (Device)	PCB Centerline
B (Device)	Center of PCB Paddle
C (Device)	Leading Edge of PCB Paddle
D (Device)	Contact Pad Corners 2 and 9
E (Device)	Contact Pad Corners 12 and 19
A (Host)	Socket cavity height centerline
B (Host)	Socket Cavity width centerline
C (Host)	Back Plane of Socket Cavity

Connector Configurations

The 0.8mm card edge connector relies on a receiving body and paddle card, which are the primary elements of a connector used for the application.

Figure 5-2 is an example which illustrates one style of unshielded cable receptacle to mate with the edge card of the drive.

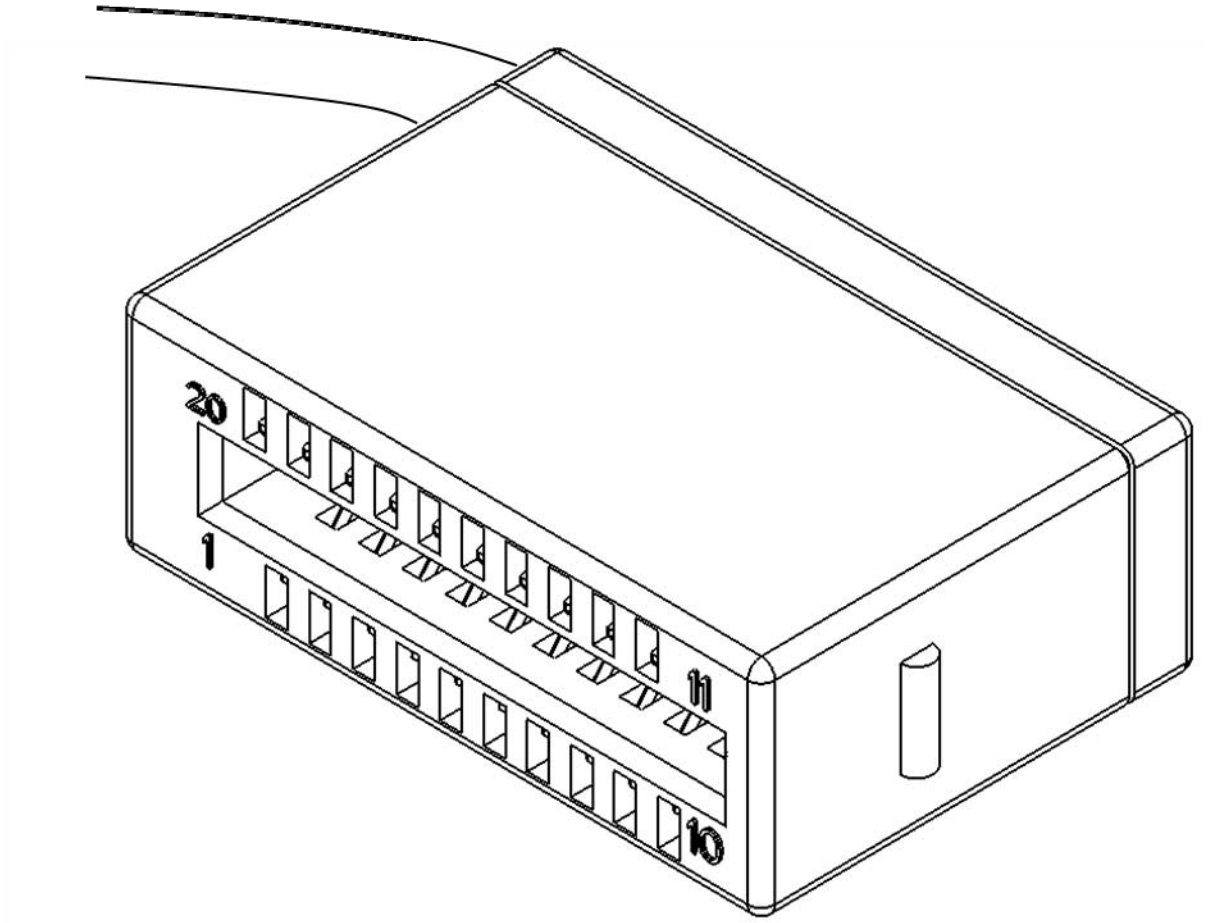


FIGURE 5-2 GENERAL VIEW OF CABLE RECEPTACLE

5.2 Mechanical Requirements

TABLE 5-2 MECHANICAL REQUIREMENTS

Items	Conditions	Acceptance Limits	Unit
Durability for Connector	EIA 364-09	100	Cycles
Durability for Mating Paddle Card	EIA 364-09	50	Cycles
Mating Force	EIA 364-13: Measurement speed: 12.7 mm per minute maximum	30 Max	N
Un-mating Force	EIA 364-13: Measurement speed: 12.7 mm per minute maximum with retention latch disengaged	20 Max	N

5.3 Contact Sequencing

To combat electrostatic discharge, static drain, protect signal pins, or for other purposes, it is desirable during cable insertion that some contacts make contact first and during extraction that these contacts break last. This function can be achieved with contact sequencing. Figure 5-2 shows an example where the advanced grounding contacts make contact first with the board side contacts and then the power contacts make contact and that the signal pins make contact after ground and power has been established. During extraction the reverse process happens.

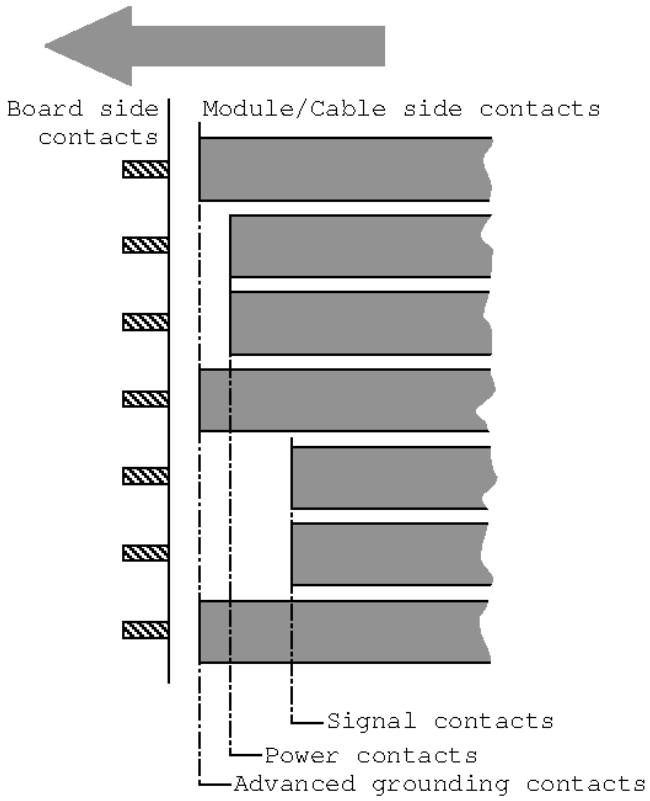


FIGURE 5-3 CONTACT SEQUENCING

5.4 Contact Numbering

The contact numbering is shown in Table 5-3. For location of contacts 1 and 20, see the Edge Card figure 6-1.

TABLE 5-3 CONTACT NUMBERING

Contacts	
1	20
2	19
3	18
4	17
5	16
6	15
7	14
8	13
9	12
10	11

6. Connector Dimensions

6.1 Edge Card

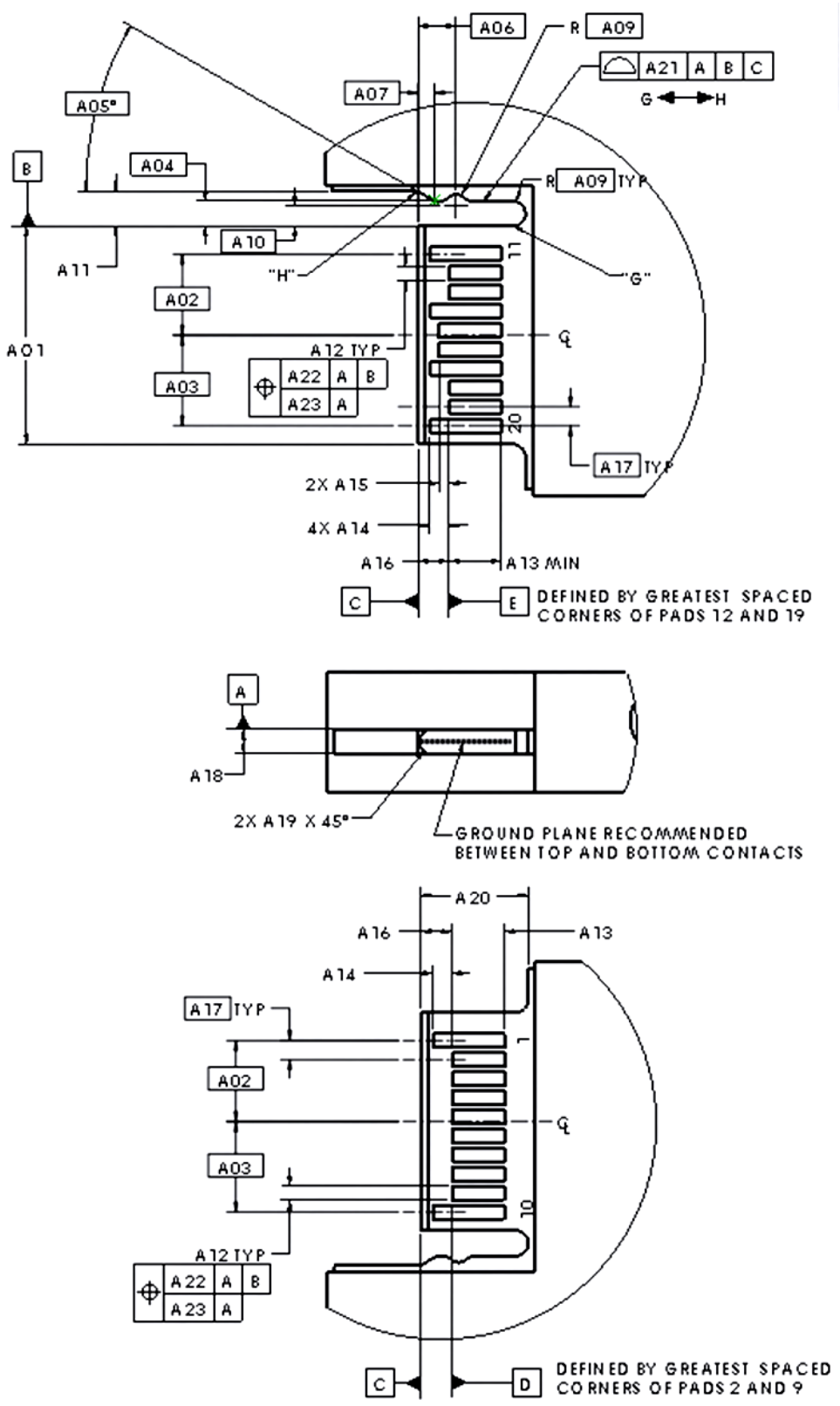


FIGURE 6-1 EDGE CARD DETAILS

TABLE 6-1 EDGE CARD DIMENSIONS

Designator	Description	mm	Tolerance
A01	Plug width	9.15	+/-0.01
A02	Contact 11 and 1 position	3.4	
A03	Contact 10 and 20 position	3.8	
A04	Detent from Datum B	1.05	
A05	Lead-in angle	30	
A06	Retaining notch from C	1.6	
A07	Detent from Datum C	0.69	
A08	Board edge from Datum C	3.6	
A09	Retaining notch radius	0.5	
A10	Retaining notch from B	0.83	
A11	Lead-in width from Datum B	1.45	MIN
A12	Contact width	0.6	+/-0.05
A13	Contact length from Datums D or E	2.2	MIN
A14	Contact length from Datums D or E	0.8	+/-0.05
A15	Contact length from Datum E	0.4	+/-0.05
A16	Datum C to Datum D or Datum E	1.3	+/-0.1
A17	Contact pitch	0.8	
A18	PCB thickness	1.0	+/-0.1
A19	PCB edge chamfer	0.3	+0.1/-0.2
A20	PCB card depth from Datum C	4.5	MIN
A21	Profile tolerance to Datums A,B,C		0.1
A22	True position to Datums A and B		0.2
A23	Feature true position		0.05

6.2 Cable Receptacle

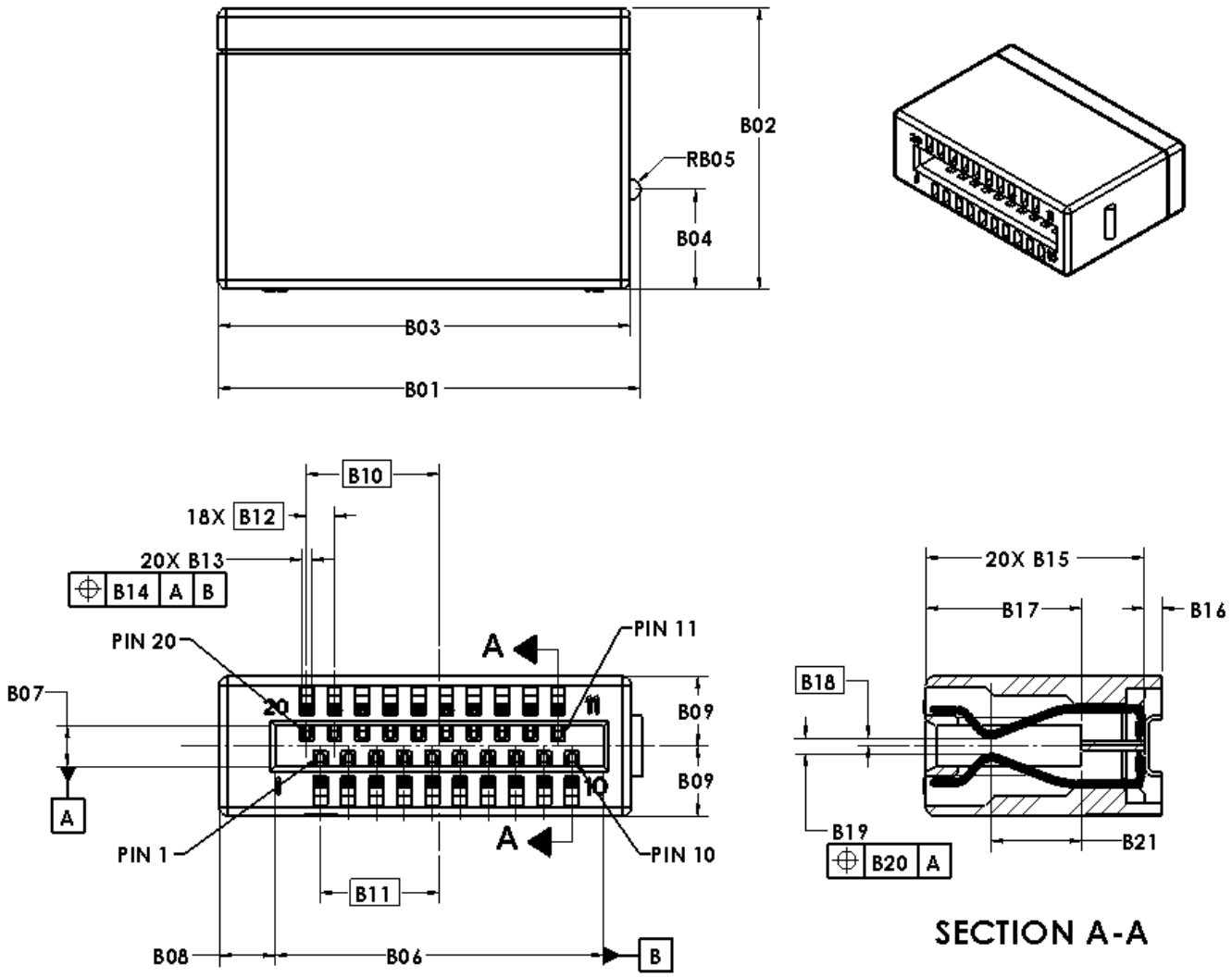


FIGURE 6-2 CABLE RECEPTACLE DETAILS

TABLE 6-2 CABLE RECEPTACLE DIMENSIONS

Designator	Description	mm	Tolerance
B01	Housing length to retention feature	12.1	+/-0.15
B02	Housing width	8.05	+/-0.15
B03	Housing length	11.8	+/-0.1
B04	Face to retention feature	2.85	+/-0.1
B05	Retention feature radius	0.3	+/-0.05
B06	Receptacle length	9.4	+/-0.08
B07	Receptacle height	1.16	+/-0.08
B08	Wall thickness	1.6	+/-0.1
B09	Height from Datum A	2	+/-0.1
B10	Contact 20 center from Datum B	3.8	
B11	Contact 1 center from Datum B	3.4	
B12	Contact pitch	0.8	
B13	Contact width	0.28	+/-0.05
B14	Position tolerance from A and B		0.25
B15	Housing width to cap surface	6.25	+/-0.1
B16	Cap thickness	0.5	+/-0.1
B17	Connector front to back plane	4.45	+/-0.1
B18	Datum A to uncompressed contact	0.18	
B19	Uncompressed contact spacing	0.36	+/-0.05
B20	True position tolerance		0.15
B21	Backplane to contact center	2.57	+/-0.15