NOTE
All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters [and inches]. Unless otherwise specified, dimensions have a tolerance of ±0.13 [±.005] and angles have a tolerance of ±2°. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of FAKRA-compliant 50-ohm coaxial male header pc board assemblies used in motor vehicle radio frequency interfaces. The male header is available in vertical and edge-mount. The male header consists of an outer shell, nose cone, center contact, dielectric, and ground contact. The nose cone features a keying code rib configuration defined by DIN 72594-1, which is identified by dash numbers (for example, -1 is key A, -2 is key B, etc.) marked on the nose cone. The male header is available with a locking nose in 3, 6, 9, or 12 o'clock position used to ensure full mating with the mating part.

These requirements apply to manual placement and robotic equipment for seating the male header on the pc board.

Basic terms and features of this product are provided in Figure 1.

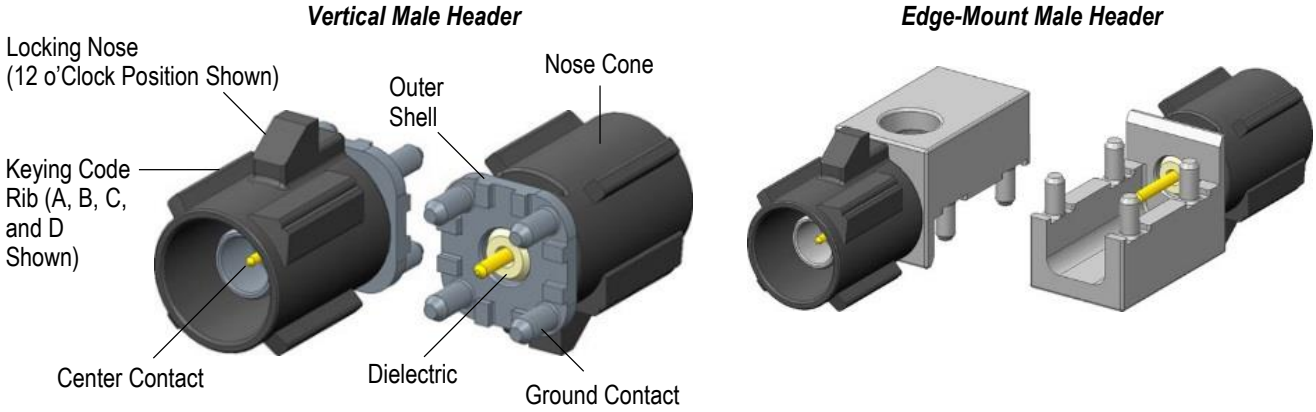


Figure 1

2. REFERENCE MATERIAL

2.1. Revision Summary

Revisions to this application specification include:

- Changed Figure 5 and Section 4, removed previous paragraph 2.5

2.2. Customer Assistance

Reference Product Base Part Numbers 2203013 and 2203452 and Product Code W765 are representative of FAKRA-compliant 50-ohm coaxial male header pc board assemblies. Use of these numbers will identify the product line and help you to obtain product and tooling information, which can be obtained by visiting www.te.com or by calling the number at the bottom of this page.

2.3. Drawings

Customer drawings for product part numbers are available from www.te.com. Information contained in the customer drawing takes priority.

2.4. Manuals

402-40 can be used as a guide to soldering. This manual provides information on various flux types and characteristics with the commercial designation and flux removal procedures. A checklist is included in the manual as a guide for information on soldering problems.

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2.5. Standards and Publications

Standards that pertain to this product are:

ISO 20860-1, “Road Vehicles—50-Ohm Impedance Radio Frequency Connection System Interface—Part 1: Dimensions and Electrical Requirements”

SAE USCAR-17, “(R) Performance Specification for Automotive RF Connector Systems”

SAE USCAR-18, “(R) FAKRA SMB RF Connector Supplement”

IPC/JEDEC J-STD-020, “Moisture/Reflow Sensitivity Classification for Non-Hermetic Solid State Surface Mount Devices”

3. REQUIREMENTS

3.1. Safety

Do not stack product shipping containers so high that the containers buckle or deform.

3.2. Operating Temperature

The male header will operate in a temperature range of -40° to 105°C [-40° to 221°F] (i.e. mounted in the terminal device). Temperatures beyond this range must be tested with appropriate mating part and cable.

3.3. Material

Customer drawings provide product material. Also, refer to the automobile industry’s International Material Data System (IMDS).

3.4. Packaging

Packaging details are provided on the customer drawing.

3.5. Storage

A. Ultraviolet Light

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the product material.

B. Shelf Life

The product should remain in the shipping containers until ready for use to prevent deformation to the contacts. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

C. Chemical Exposure

Do not store product near any chemical listed below as they may cause stress corrosion cracking in the material.

Alkalies	Ammonia	Citrates	Phosphates Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites	Tartrates

3.6. PC Board

A. Material and Thickness

The pc board material can be glass epoxy (FR4 or G-10) dependent on the temperature range of the application. The pc board thickness range shall be 1.57 to 1.90 [.062 to .075].

B. Tolerance

Maximum allow bow of the pc board shall be 0.03 [.001] over the length of the male header.

C. Layout

The recommended pc board layout is provided on the specific male header customer drawing.

D. Pads

The pc board circuit pads must be plated to avoid bare copper oxidization so that the pads and lands are readily solderable. The pads underneath the male header contacting surface area must be free of solder resist (solder mask) coating.

E. Hole Dimensions

The contact holes in the pc board must be drilled and plated through (recommendations are given on customer drawing). The drilled hole size, plating types, and plating thickness are dependent on the application.

3.7. Spacing

Care must be used to avoid interference between adjacent male headers and other components. The minimum allowable distance between male headers to ensure proper mating is provided in Figure 2.

NOTE
The dimension applies to manual placement. If robotic equipment is used, other space allowances will be required for the grippers.

Minimum Allowable Distance

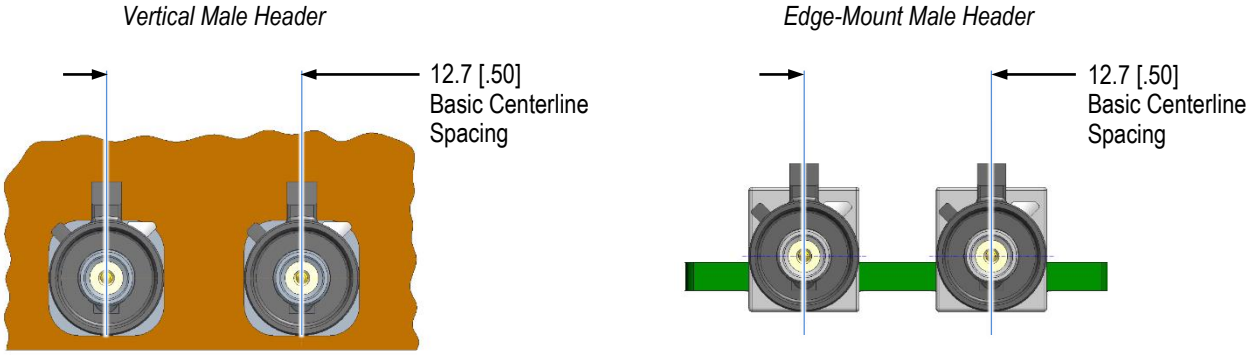


Figure 2

3.8. Placement

When placing male headers on the pc board, the contacts must be aligned and started into the matching holes before seating. When the male header is seated, the standoffs must be flush with the pc board. See Figure 3.

Placement

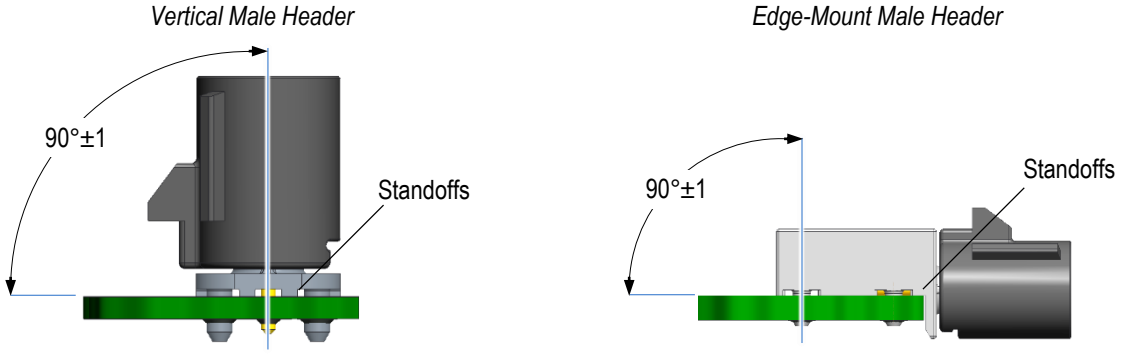


Figure 3

3.9. Soldering

A. Flux

Contacts must be fluxed prior to soldering with a mildly active, rosin base flux. Selection of the flux will depend on the type of pc board and other components mounted on the pc board. Additionally, the flux must be compatible with the wave solder line, manufacturing, health, and safety requirements. Call the number at the bottom of page 1 for consideration of other types of flux. Flux that is compatible with these male headers is provided in Figure 4.

TYPE	ACTIVITY	RESIDUE	COMMERCIAL DESIGNATION	
			ALPHA	KESTER
RMA	Mild	Noncorrosive	611	186

Figure 4

B. Process

Reflow or wave soldering or a similar process (pin-in-paste, pin-in-hole) can be used. Solder SN60 or SN62 or similar solder is recommended. The solder compounds must be RoHS compliance. For lead-free reflow soldering, it is recommended using solder paste SnAg3,0Cu0,5 or solder pastes with 3,04,0% Ag,0,5-1,0%Cu, rest Sn and the solder reflow profile given in Figure 5.

In case of solderability problems, the components can be tested according to IPC/JEDEC J-STD-020.

NOTE
It is recommended that a hold-down be used until the soldering process is completed.

Lead-Free Solder Reflow Profile

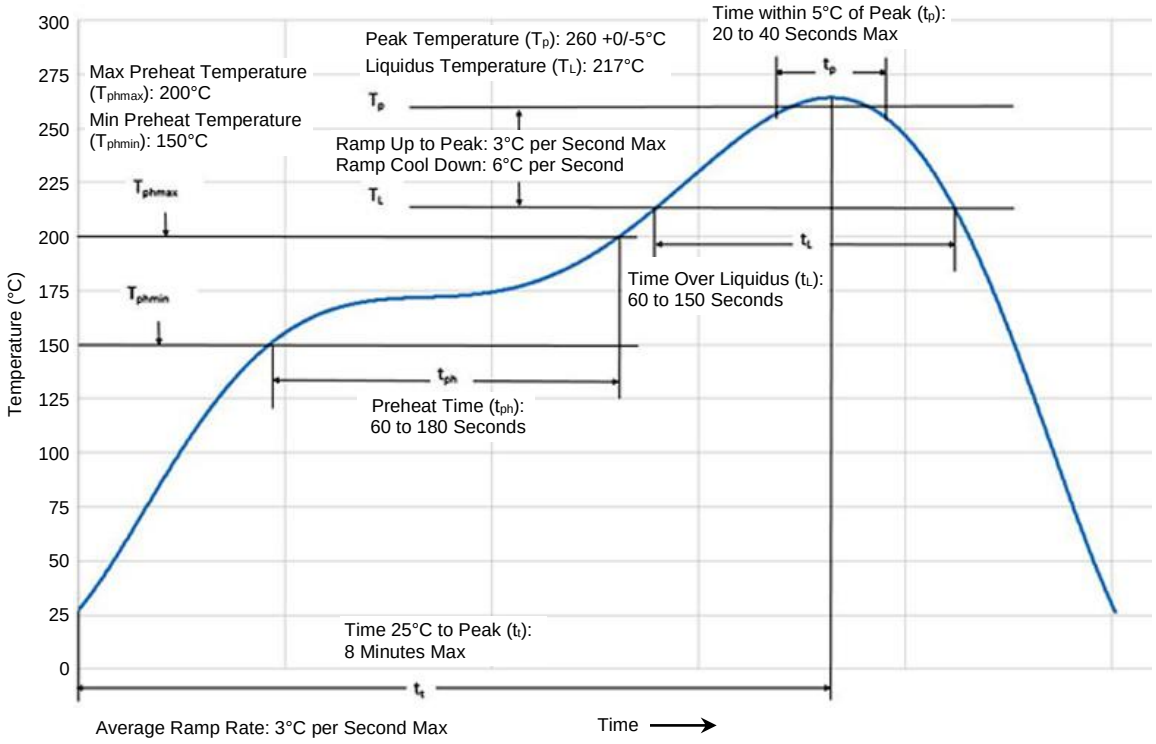


Figure 5

ALPHA and KESTER are trademarks of their respective owners.

C. Cleaning

After soldering, removal of fluxes, residues, and activators is necessary. Consult with the supplier of the solder and flux for recommended cleaning solvents. Cleaners must be free of dissolved flux and other contaminants. Common cleaning solvents with time and temperature that will not affect the male header are given in Figure 6.

CLEANER		TIME (Minutes)	TEMPERATURE (Max)
NAME	TYPE		
ALPHA 2110	Aqueous	1	132°C [270°F]
BIOACT EC-7	Solvent	5	100°C [212°F]
Butyl CARBITOL	Solvent	1	Ambient Room
Isopropyl Alcohol	Solvent	5	100°C [212°F]
KESTER 5778	Aqueous		
KESTER 5779	Aqueous		
LONCOTERGE 520	Aqueous		
LONCOTERGE 530	Aqueous		
Terpene	Solvent		

Figure 6

CAUTION
Even when using "no clean" solder paste, it is imperative that the contact interface be kept clean of flux and residue, since it acts as an insulator. Flux may migrate under certain conditions with elevated temperatures; therefore, cleaning is necessary.

DANGER
Consideration must be given to toxicity and other safety requirements recommended by the solvent manufacturer. Refer to the manufacturer's material safety data sheet (MSDS) for characteristics and handling of cleaners. Trichloroethylene and methylene chloride is not recommended because of harmful occupational and environmental effects. Both are carcinogenic (cancer-causing).

D. Drying

When drying cleaned assemblies, temperature limitations must not be exceeded: -40° to 100°C [-40° to 212°F].

3.10. Keying

Molded-in keying ribs prevent inadvertent mating of similar assemblies. The quantity and position of the keying combinations varies. Keying information is defined on the customer drawing for the male header.

3.11. Checking Installed Male Header Assembly

The standoffs must be fully seated on the pc board as shown in Figure 3. Solder fillet must be evenly formed around each contact. Refer to Figure 7.



Figure 7

BIOACT, CARBITOL, and LONCOTERGE are trademarks of their respective owners.

3.12. Replacement and Repair

The male header is not repairable. Damaged or defective male headers must not be used.

The male header can be removed from the pc board by standard de-soldering methods. These male headers must not be re-used after removal.

4. QUALIFICATION

Agency evaluation for FAKRA-compliant 50-ohm coaxial male header pc board assemblies was not defined at the time of publication of this specification.

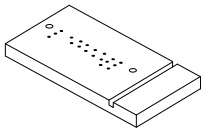
5. TOOLING

5.1. PC Board Support

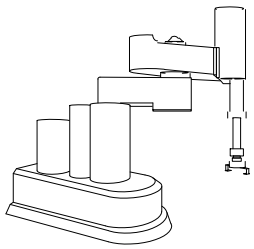
A pc board support should be used to prevent bowing of the pc board during the placement of a male header on the board. It should have flat surfaces with holes or a channel wide enough and deep enough to receive the solder tines during seating. See Figure 8.

5.2. Robotic Equipment

If used, the robotic equipment must have a true position accuracy tolerance of 0.25 [.010] to properly locate the male header. This includes gripper and fixture tolerances as well as equipment repeatability. This equipment must use the male header datum surfaces detailed on the customer drawing to ensure reliable placement.



PC Board Support
(Customer Supplied)



Robotic Equipment Option

Figure 8

6. VISUAL AID

The illustration below shows a typical application of FAKRA-compliant 50-ohm coaxial male header pc board assemblies. This illustration should be used by production personnel to ensure a correctly applied product. Applications which do not appear correct should be inspected using the information in the preceding pages of this specification and in the instructional material shipped with the product or tooling.

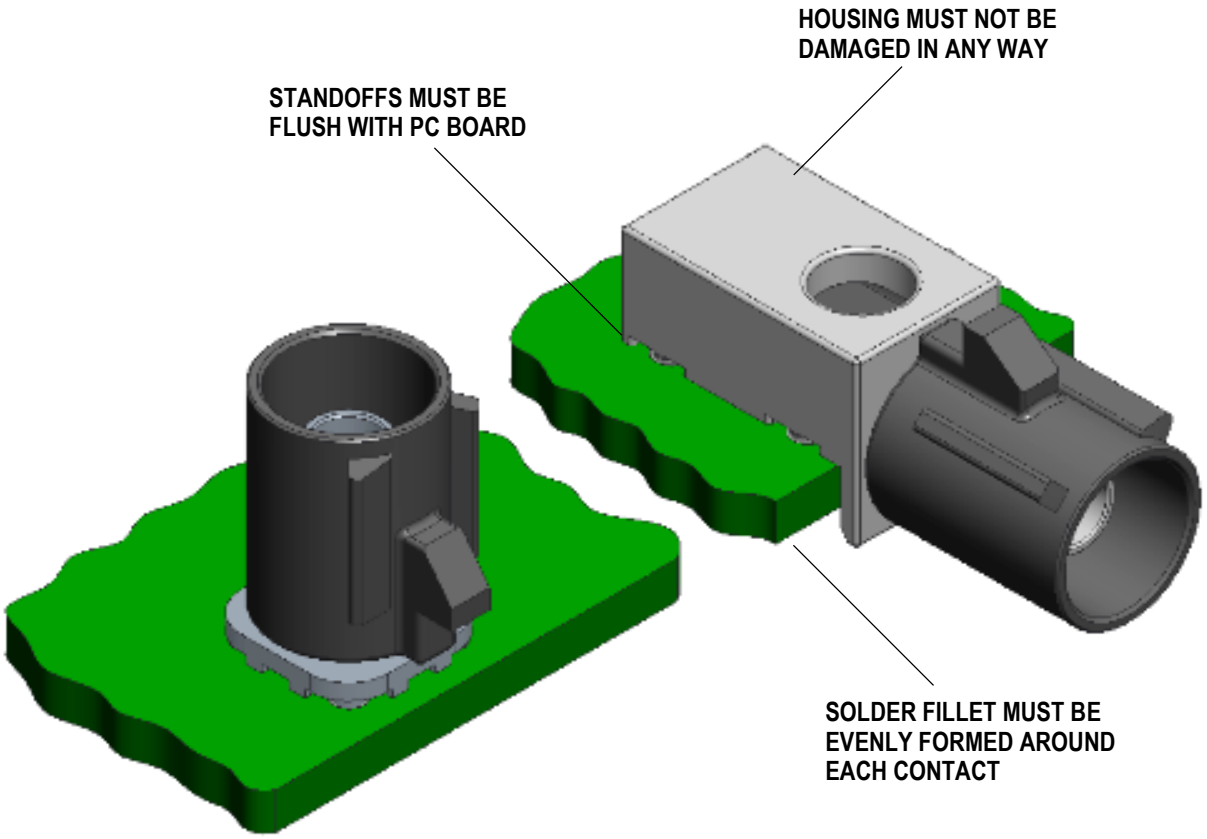


FIGURE 9. VISUAL AID

Unikeyic Electronics

Global Electronic Components Distributor

Click to view pricing, inventory, delivery, and lifecycle information:

TE Connectivity:

1393431-1 3430B2F51RTDF SMW73R0JT 141991-2 1903112-2 2310537-1 2380312-2 1-794222-0
1-962915-1 2377783-2 3631B101LL 917696-1 ROX05SJ18R SBCHE64R7K 1743455-2 175977-2
2-292161-3 CPF0402B37K4E1 CRGCQ2010J3K3 SBCHE154R7K 1969656-1 2005330-1 3-1393225-0
650075-000 U5254-000005-030PA 936348-1 MPT100C18RF RH73H2A40MKTN 2834055-1 TE50BR39J