

NUMBER GS-12-447	TYPE PRODUCT SPECIFICATIONS		
TITLE Metral RECEPTACLE F serieHM1 and NGEN versions Straight and Right Angle PRESS-FIT		PAGE 1 of 9	REVISION C
		AUTHORIZED BY Terran Huang	DATE 2012-06-11
		CLASSIFICATION <b>UNRESTRICTED</b>	

## 1.0 OBJECTIVE

This specification defines the performance, test and reliability requirements of the Receptacle Straight and Right Angle Press-Fit product.

## 2.0 SCOPE

This specification is applicable to the termination characteristics of the Metral RECEPTACLE, which provides a separable, interconnect for printed circuit boards.

## 3.0 GENERAL

This document is composed of the following sections:

Paragraph	Title
1.0	OBJECTIVE
2.0	SCOPE
3.0	GENERAL
4.0	APPLICABLE DOCUMENTS
5.0	PERFORMANCE LEVELS
6.0	REQUIREMENTS
7.0	ELECTRICAL CHARACTERISTICS
8.0	MECHANICAL CHARACTERISTICS
9.0	ENVIRONMENTAL CONDITIONS
10.0	PACKAGING

### 3.1 **Lead Free / RoHs informations**

All product where the part number ends in 'LF' meet the European Union directives and other country regulations as described in GS-22-008.

The part numbers that do not end in 'LF' meet all regulations except for Pb in SnPb plating.

Termination plating specification: 0.5 $\mu$  to 3 $\mu$  Nickel underlayer with 0.5 $\mu$  to 1.5 $\mu$  Pure TIN (matte)  
Packaging specification: see GS-14-920

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#### 4.0 APPLICABLE DOCUMENTS

##### 4.1 FCI Specifications

4.1.1 Engineering drawings: C-8626-xxxx

##### 4.2 Industry Product Specifications

- 4.2.1 IEC61076-4-104 Printed Board Connectors with Assessed Quality –Detail Specification for Two-part Modular Connectors, Basis Grid of 2mm, with Terminations on a multiple Grid of 0.5mm
- 4.2.2 EIA616 2 Millimeter, Two-Part Connectors for use with printed Boards and Back planes

##### 4.3 Industry Performance Standards and Procedures

- 4.3.1 Telcordia GR-1217-CORE Generic Requirements for separable electrical connectors Used in Telecommunications Hardware
- 4.3.2 EIA 364: Electrical Connector/Socket test procedures including Environmental Classifications.
- 4.3.3 IEC 60512 Electromechanical components for electronic equipment, Basic testing procedures and measuring methods
- 4.3.4 IEC 60352-5 Solderless Press-in connections  
General requirements, tests methods and practical guidance

##### 4.5 Others Standards and Specifications

- 4.5.1 UL94-VO Flammability

##### 4.6 Tests Report

- 4.6.1 IEC Class 1 E91091 date: 10/12/1992 (FCI CRC)  
E93003 date: 11/01/1993 (FCI CRC)  
EA5-2705 date: 21/08/2006 (FCI DB)
- 4.6.2 Telcordia CO R05-019 date: 10/12/1992 (FCI LFB)  
EA-1-2766 date: 26/04/2002 (FCI DB)  
EA-1-2767 date: 26/04/2002 (FCI DB)

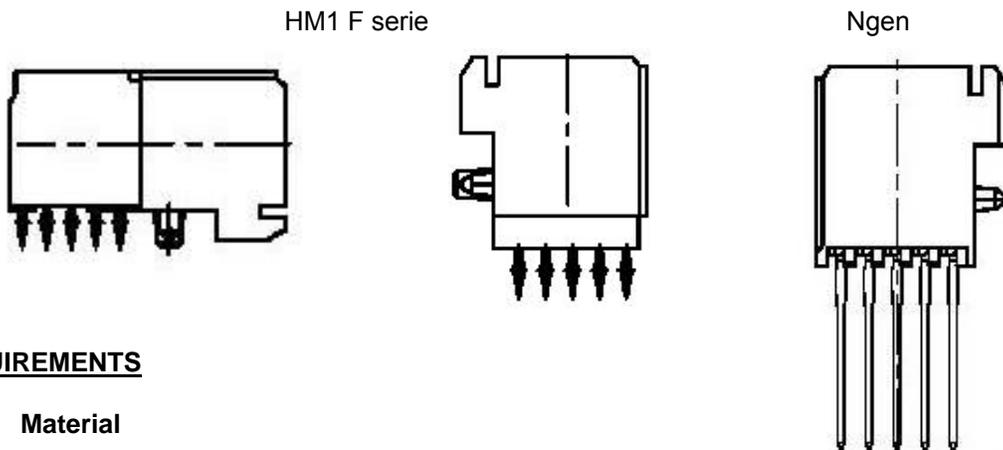
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## 5.0 PERFORMANCES LEVELS

Part Numbers:

**HM1FxxxxxxxxH6(P)**    or    **52016-1yy , 85xxx-1yy**    (Specific for NGEN Straight)  
**HM1SxxxxxxxxH6(P)**  
**HM1FxxxxxxxxH6(P)LF**                    **52016-1yyLF , 85xxx-1yyLF**  
**HM1SxxxxxxxxH6(P)LF**

These Part/Numbers meet requirements for  
**-IEC 61076-4-104 Class 1**  
**-Telcordia GR-1217 CENTRAL OFFICE (CO), 4 Gazes**



## 6.0 REQUIREMENTS

### 6.1 **Material**

Contacts..... Phosphor Bronze Alloy

Front housings

for HM1xxxxxxxxH6(P)

HM1xxxxxxxxH6(P)LF .....Glass filled LCP Thermoplastic, UL94V0 flammability rating

Or converged part Numbers    colour: Natural

Rear housings or Keepers.....Glass filled LCP Thermoplastic, UL94V0 flammability rating

colour: Natural

### 6.2 **Contacts Finish (Plating)**

The finish for applicable components shall be as specified herein or equivalent.

The terminals mating areas shall be plated with either

-Gold over Nickel 50u" (1.27µm) minimum underplate, or

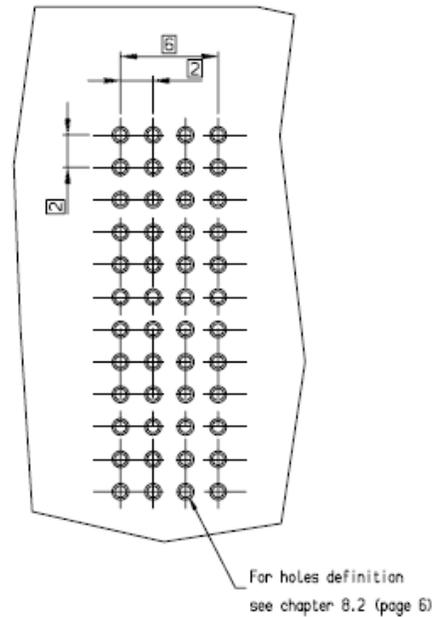
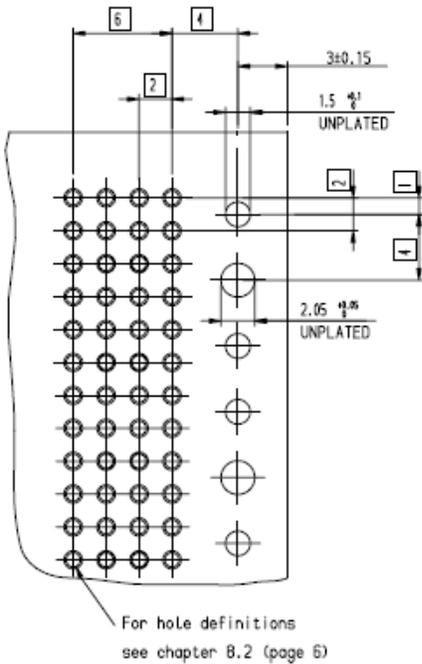
-Gold over Palladium/Nickel over Nickel 50u" (1.27µm) minimum underplate.

-Pure TIN or TIN LEAD on Press-Fit areas over 50u" (1.27µm) minimum nickel underplate

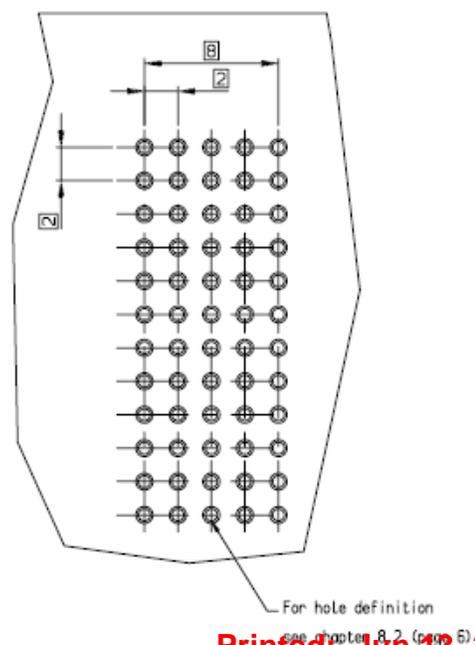
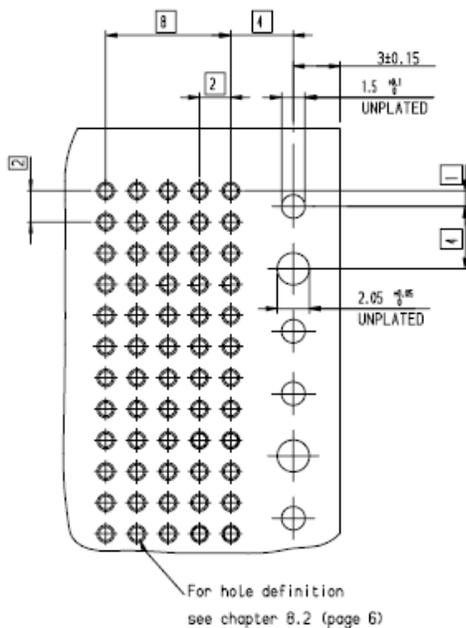
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### 6.3 PCB recommended layout

#### Receptacle for 4 row Press-fit and Straight



#### Receptacle for 5 row Press-fit and Straight



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## 7.0 ELECTRICAL CHARACTERISTICS

### 7.1 **Low Level Contact Resistance (LLCR)**

The low level contact resistance shall not exceed the values shown below when measured in accordance with IEC60512 test 2a (mated with Header)

-Signal contact Row A, B, C, D, E : 20 mΩ Maximum

### 7.2 **Insulation Resistance**

The insulation resistance of unmated connector between to adjacent contacts shall not be less than 5000 MΩ (megaOhms) initially, and shall not be less than 1000 MΩ after environmental exposure. Test in accordance with IEC60512, test 4a

### 7.3 **Dielectric Withstanding Voltage**

There shall be no evidence of arc-over, insulation breakdown, when a test voltage of 1000V rms is applied. Test methodology in accordance with IEC60512, test 4a

### 7.4 **Pin Current Capacity**

#### 7.4.1 **Nominal Current**

The nominal current carrying capacity shall be:

-1.5A (Amperes) per signal contact

-3A per power blade contact

when current is applied to all contacts. Test methodology in accordance to IEC60512, test 5b

#### 7.4.2 **Maximum Current capacity**

The maximum current capacity shall be:

-Signal contact 2 A (Amperes) at 20°C / 1.5A at 70°C

### 7.5 **Creepage and Clearance distances**

The minimum distance for creepage and clearance is: 0.60mm

### 7.6 **Wipping Length**

The wipping length in plug in direction is: 2.0mm

When mating Header with Metral HEADER

### 7.7 **Capacitance**

The specification requirement shall be satisfied when evaluated in accordance with FCI Test Specification BUS-03-114 and the following details:

- a. Spécification requirement 2.2 pF max.
- b. Sample test conditions
  - Frequency 1mhz
  - Amplitude 1volts
  - Surrounding Contacts tied to ground

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### 7.8 Inductance

The inductance between adjacent contacts shall be no greater than 25 nH, and between one contact and all other surrounding contacts grounded shall be no greater than 15 nH. The following details apply per BUS-03-113:

- a. Connectors shall be mated.
- b. Measurements shall be made from tail to tail tip.
  - a. Test conditions 1 ns rise time pulse (0.0V to 1.0V), with a 50 –ohm termination.
  - b. Measurement equipment: Sampler/TDR/Scope equipment with a 50 Ohm reference impedance.

### 8.0 MECHANICAL CHARACTERISTICS

#### 8.1 Contact Retention to Housing

There shall be no loosening of the contact or damage to the contact, contact displacement 0.1mm maxi when a axial force of 5N is applied to a contact  
Test in accordance to IEC60512, test 15a

#### 8.2 PCB Holes definitions

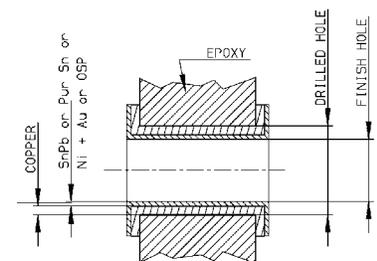
		PRESS-FIT TERMINATION Hole : Ø0.7mm		
		TIN LEAD Holes	Pure TIN Holes	COPPER OSP Holes
P.C.B HOLES DEFINITION	Drill Diameter	Ø0.85 REF (Note 3)	Ø0.85 REF (Note 3)	Ø0.85 REF (Note 3)
	Drilled Hole	Ø0.81 -0.86	Ø0.81 -0.86	Ø0.81 -0.86
	Copper Underplating	25µ min i/ 50µ maxi	25µ min i/ 50µ maxi	25µ min i/ 50µ maxi
	TIN-LEAD holes (SnPb)	5µ mini – 15µ maxi		
Note 1 and 2	Pure TIN holes (Sn)		0.8µ mini – 1.2µ maxi	
	COPPER holes (OSP)			0.2µ mini – 0.5µ maxi
	FINISH HOLE – (Note 4)	Ø0.65 / Ø0.80	Ø0.69 / Ø0.80	Ø0.70 / Ø0.80

Note 1: These dimensions must be respected to secure Press-Fit Performances

Note 2: According to IEC-352-5 Specification

Note 3: Major requirement for Press-Fit performance

Note 4: Dimensions after reflow for Pure TIN and TIN LEAD



#### 8.3 Press-Fit Performances

		EON + SPECIFIED HOLE DIM
Insertion Force (N) –All plating types		≤ 55 N
Extraction Force (N)	Tin Lead hole Plated	≥ 15 N
	Pur Tin hole Plated	≥ 15 N
	Cu hole Plated (OSP)	≥ 15 N
		Receptacle HM1x Str. / RA Receptacle Straight Ngen

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## 9.0 ENVIRONMENTAL CONDITIONS

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements of sections 7.0 and 8.0

### 9.1 **Thermal Shock**

Mated connectors shall be tested with cyclic variation from -55°C to +125°C for a minimum of 5 cycles ,30minutes at each extreme temperature,2 hours recovery time  
Test according to IEC60512,test 11d

### 9.2 **Temperature life**

Mated connectors shall be tested at a temperature of 125°C for 1000 hours  
Test according to IEC60512, test 9b

### 9.3 **Moisture Resistance (Steady State Damp Heat)**

Mated connectors shall be tested at a temperature humidity environment of 55°C and 93% R.H. for a total exposure of 56 days.  
Test methodology shall be in accordance with IEC 60512, test 11C.

### 9.4 **Durability**

Mating / Unmating with an appropriately header connector with a minimum of 250 operations without any damages on contact area  
Test methodology shall be in accordance with IEC 60512, test 9a.

### 9.5 **Vibration**

Mated connectors shall be tested in accordance with IEC 60512, test 6d. Test duration shall be monitored continuously during the vibration by an event detector, which is capable of detecting interruptions of one 1 microsecond or less.

Frequency Range: 10 HZ – 2,000 HZ  
Amplitude: 200m/s<sup>2</sup>.  
10 sweeping cycles per axis. Full duration per axis is 2 hours

### 9.6 **Shocks**

Mated connectors shall be tested according to IEC 60512, test 6C. Connectors shall be exposed to 6 shocks in each of the 3 axis directions, for a total of 18 shocks. Continuity shall be monitored continuously during the shock by an event detector, which is capable of detecting interruptions of 1 microsecond or less.

Half-Sine Excitation: 30 g's  
Duration: 11 ms

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### 9.7 Industrial Mixed Flowing Gas (4 Gazes MFG)

Durability - Standard laboratory procedure as applicable to the specific product.

- a. Number Cycles - 98 or 99 cycles per Table 1
- b. Cycling Rate - 5 inches per minute

Mated connectors shall not experience a change in low-level contact resistance (LLCR) greater than 10mΩ at any time during the sequence. Connectors shall be tested in accordance with section 9.1.3 of Telcordia GR-1217 CORE, central office (CO) conditions  
Test sequence shall be a 10-day parallel mated and unmated exposure as per section 9.1.3.2 of the Telcordia GR-1217 CORE specification. Temperature shall be 30° ±1° Celsius with relative humidity at 70% ±2%.

Gas	Four (4) Gas Mixture Central Office Environment
NO <sub>2</sub>	200 ± 50 ppb
CL <sub>2</sub>	10 ± 3 ppb
H <sub>2</sub> S	10 ± 5 ppb
SO <sub>2</sub>	100 ± 20 ppb

Disturb - an Instron compression/tensile tester shall be used to back the fully seated receptacle from the header by 0.10mm. The sample is then removed and measurements made.

Durability - Standard laboratory procedure as applicable to the specific product.

- a. Number Cycles - 98 or 99 cycles per Table 1
- b. Cycling Rate - 5 inches per minute
- a. per sections 9.1.1.1 and Table 9-1

### 10.0 PACKAGING

When suffix "P" is added in the Part/Number, the packaging is TRAY  
(Example HM1W5xxxxxxxH6PLF)

**But marking on the connector is without P, (Example HM1W5xxxxxxxH6LF)**

- The preferred packaging for Vertical Receptacle is TUBE
- The preferred packaging for Right Angle Receptacle is TRAY

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**REVISION RECORD**

REV	PAGE	DESCRIPTION	EC #	DATE
A	All	New Release	LS07-0072	2007-03-23
B	4	Add PCB recommended layout	LS08-0131	2008-05-22
C	6	Remove column Baby H from the table in clause 8.3 Correct IEC standard references.	V-011074	2012-06-11

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