



January 11, 2005  
PPCN #040008

## **PROCESS/ PRODUCT CHANGE NOTIFICATION**

This is to inform you of the status and changes associated with Micrel Semiconductor's High Bandwidth, HBW, Lead (Pb)-free product. HBW products have Micrel part numbers beginning with the SY-prefix. Micrel is in the process of releasing Pb-Free package options for all SYxxxxx parts as an alternative to the standard Tin-Lead (Sn-Pb) package. Micrel is NOT discontinuing any existing Sn-Pb package options, but we encourage you to transition to our Pb-free packages that are backward compatible to tin-lead solder systems. Micrel's primary Pb-Free package finish will be Nickel-Palladium-Gold, NiPdAu. All Micrel HBW Pb-Free parts (parts with "SY" prefix) will be NiPdAu, unless NiPdAu lead finish is not available for a particular package. In the case that the NiPdAu finish is not available, typically a matte-tin alternative is provided.

If you have any questions concerning this change, please contact:

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## **TYPE OF CHANGE**

Terminal plating change from matte tin or tin-lead solder to palladium nickel gold. Part number and product marking will change corresponding to plating change. Products with PdNiAu lead finish will also include a halogen free mold compound. ***In order to receive Pb-free product the product must be ordered with a Pb-free part number.***

## **EFFECTIVITY**

Per schedule attached. If Pb-free is required prior to the date of NiPdAu availability then contact factory for matte tin.

## **PRODUCT ID (DESCRIPTION)**

High Bandwidth products identified by part numbers starting with SY



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**DESCRIPTION OF CHANGE:**

Micrel previously announced that the predominant lead (Pb)-free termination would be matte tin with a few products using NiPdAu. These Pb-free products typically use a "Y" in place of the temperature code in the part number to uniquely identify the product as Pb-free (See attached table for part marking scheme). Micrel is announcing that it intends to use Nickel-palladium-gold (NiPdAu) as its primary terminal finish. For Pb-free high bandwidth product previously released in a matte tin finish with the Y product designator we will change these products to NiPdAu and we will change the part designation to a "G". In addition, these products will be in a bromide and antimony free mold compound. The "Y" designator will continued to be used for products that use the matte tin finish, or use matte tin and NiPdAu interchangeably, or where the termination is Pb-free and the mold compound contains halogenated flame retardants. The "G" designator will be used for "Green" products that we define as NiPdAu termination plating with a halogen free compound. Our primary package for high bandwidth will be a "Green" package consisting of NiPdAu and halogen-free mold compound. Both matte tin and NiPdAu terminations are ROHS compliant.

**Summary of Change:**

- Customers should begin transition to Pb-free products.
- Micrel is NOT discontinuing any existing Sn-Pb package options.
- All Micrel HBW Pb-Free parts (parts with "SY" prefix) will be NiPdAu, unless the package is not available. In the cases where the NiPdAu package is not available, a matte-tin alternative will be provided.
- HBW Pb-Free Packages will be coded with a suffix ending with one of the following:
  - SYxxxxxxY or Z → Matte-Sn Pb-Free finish Industrial or Commercial Temperature
  - SYxxxxxxG or H → NiPdAu Pb-Free Industrial or Commercial Temperature
- NiPdAu and Matte-Sn Pb-Free packages are RoHS compliant.
- Matte tin and NiPdAu are both backward compatible with tin lead solder. Both finishes can be used in combination with tin-lead product and solder systems.
- Pb-free products are rated for 260C maximum reflow temperature



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- In some cases, existing parts currently in the Micrel system coded with a “Y” suffix denoting matte tin will be replaced with the “G” suffix denoting NiPdAu, and the “Y” suffix version will be obsolete.
- Pb-Free Package Code Summary:
  - All MLF\* or QFN Pb-Free packages will be NiPdAu, coded with the “G” suffix.
  - All SOIC Pb-Free packages will be NiPdAu, coded with the “G” or “H” suffix.
  - All TQFP Pb-Free packages will be NiPdAu, coded with the “G” or “H” suffix.
  - All MSOP & QSOP Pb-Free packages will be NiPdAu, coded with the “G” suffix.
  - All TSSOP Pb-Free packages will be NiPdAu, coded with the “G” suffix.
  - All PLCC Pb-Free packages will be matte-tin, coded with a “Y” or “Z” suffix.
  - CerPak/Flatpak package will not be offered in a Pb-Free option.

\* MLF is an AMKOR trademark

## AFFECTED MICREL PRODUCT ID's (SY suffix only)

Existing: Sn-Pb Package Ordering Code	Addition: Pb-Free Package Ordering Code	Pkg/Pb-Free Material	Product Available
SY10/100ExxxJC & JC TR	SY10/100ExxxJY & JY TR	PLCC/ Matte-Sn	Feb 2005
SY10/100ExxxJI & JI TR	SY10/100ExxxJY & JY TR	PLCC/ Matte-Sn	Feb 2005
SY100ExxxLJI & LJI TR	SY100ExxxLJY & LJY TR	PLCC/Matte-Sn	Feb 2005
SY100ExxxLTI & LTI TR	SY100ExxxLTG & LTG TR	LQFP/NiPdAu	Jul 2005
SY10/100EL16VxZC & VxZC TR	SY10/100EL16VxZG & VxZG TR	8 SOIC/ NiPdAu	Jan 2005
SY10/100EL16VxZI & VxZI TR	SY10/100EL16VxZG & VxZG TR	8 SOIC/ NiPdAu	Jan 2005
SY10/100EL16VDZC & VDZC TR	SY10/100EL16VDZG & VDZG TR	16-SOIC/ NiPdAu	Jan 2005
SY10/100EL16VDZI & VDZI TR	SY10/100EL16VDZG & VDZG TR	16-SOIC/ NiPdAu	Jan 2005
SY100EL16VOKC & VOKC TR	SY100EL16VOKG & VOKG TR	10-MSOP/NiPdAu	Jan 2005
SY100EL16VOKI & VOKI TR	SY100EL16VOKG & VOKG TR	10-MSOP/NiPdAu	Jan 2005
SY10/100ELxxVZC & VZC TR	SY10/100ELxxVZG & VZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100ELxxVZI & VZI TR	SY10/100ELxxVZG & VZG TR	16-20 SOIC/ NiPdAu	Mar 2005
SY10/100ELxxLZC & LZC TR	SY10/100ELxxLZG & LZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100ELxxLZI & LZI TR	SY10/100ELxxLZG & LZG TR	16-20 SOIC/ NiPdAu	Mar 2005
SY10/100ELxxZC & ZC TR	SY10/100ELxxZG & ZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100ELxxZI & ZI TR	SY10/100ELxxZG & ZG TR	16-20 SOIC/ NiPdAu	Mar 2005
SY10/100ELTxxVZC & VZC TR	SY10/100ELTxxVZG & VZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100ELTxxVZI & VZI TR	SY10/100ELTxxVZG & VZG TR	16-20 SOIC/ NiPdAu	Mar 2005
SY10/100ELTxxLZC & LZC TR	SY10/100ELTxxLZG & LZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100ELTxxLZI & LZI TR	SY10/100ELTxxLZG & LZG TR	16-20 SOIC/ NiPdAu	Mar 2005
SY10/100ELTxxZC & ZC TR	SY10/100ELTxxZG & ZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100ELTxxZI & ZI TR	SY10/100ELTxxZG & ZG TR	16-20 SOIC/NiPdAu	Mar 2005
SY100EP140LZI & LZI TR	SY100EP140LZG & LZG TR	8-SOIC/ NiPdAu	Jan 2005
SY100EP16VSKC & VSKC TR	SY100EP16VSKG & VSKG TR	8-MSOP/NiPdAu	Jan 2005
SY100EP16VSKI & VSKI TR	SY100EP16VSKG & VSKG TR	8-MSOP/NiPdAu	Jan 2005
SY10/100EPxxVZC & VZC TR	SY10/100EPxxVZG & VZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100EPxxVZI & VZI TR	SY10/100EPxxVZG & VZG TR	8-SOIC/ NiPdAu	Jan 2005
SY10/100EPxxVKC & VKC TR	SY10/100EPxxVZG & VZG TR	8-MSOP/NiPdAu	Jan 2005
SY10/100EPxxVKI & VKI TR	SY10/100EPxxVZG & VZG TR	8-MSOP/NiPdAu	Jan 2005
SY100EPxxLKC & LKC TR	SY100EPxxLKG & LKG TR	8-MSOP/NiPdAu	Jan 2005
SY100EPxxLKI & LKI TR	SY100EPxxLKG & LKG TR	8-MSOP/NiPdAu	Jan 2005
SY10/100EPTxxVZC & VZC TR	SY10/100EPTxxVZG & VZG TR	8-SOIC/NiPdAu	Jan 2005
SY10/100EPTxxVZI & VZI TR	SY10/100EPTxxVZG & VZG TR	8-SOIC/NiPdAu	Jan 2005
SY10/100EPTxxVKC & VKC TR	SY10/100EPTxxVZG & VZG TR	8-MSOP/NiPdAu	Jan 2005
SY10/100EPTxxVKI & VKI TR	SY10/100EPTxxVZG & VZG TR	8-MSOP/NiPdAu	Jan 2005
SY10/100EPTxxLKC & LKC TR	SY10/100EPTxxLKG & LKG TR	8-MSOP/NiPdAu	Jan 2005
SY10/100EPTxxLKI & LKI TR	SY10/100EPTxxLKG & LKG TR	8-MSOP/NiPdAu	Jan 2005
SY100EPxxUK4I & UK4I TR	SY100EPxxUK4G & UK4G TR	16-TSSOP/NiPdAu	Nov 2005
SY100EPxxVK4I & VK4I TR	SY100EPxxVK4G & VK4G TR	20-TSSOP/NiPdAu	Nov 2005
SY100EPxxxUTC & UTC TR	SY100EPxxxUTG & UTG TR	32-TQFP/NiPdAu	Jul 2005
SY100EPxxxUTI & UTI TR	SY100EPxxxUTG & UTG TR	32-TQFP/NiPdAu	Jul 2005
SY100EPxxxVTI & VTI TR	SY100EPxxxVTG & VTG TR	32-TQFP/NiPdAu	Jul 2005
SY100SxxxLZC & LZC TR	SY100SxxxLZG & LZG TR	16-SOIC/NiPdAu	Mar 2005
SY100SxxxVZC & VZC TR	SY100SxxxVZG & VZG TR	16-SOIC/NiPdAu	Mar 2005
SY100S83xZC & ZC TR	SY100S83xZG & ZG TR	16-SOIC/NiPdAu	Mar 2005
SY100S83xZI & ZI TR	SY100S83xZG & ZG TR	16-SOIC/NiPdAu	Mar 2005
SY100SxxxJC & JC TR	SY100SxxxJZ & JZ TR	PLCC/Matte-Sn	Feb 2005
SY10H35xJC & JC TR	SY10H35xJZ & JZ TR	PLCC/Matte-Sn	Apr 2005
SY10/100H6xxAJC & AJC TR	SY10/100H6xxAJZ & AJZ TR	PLCC/Matte-Sn	Feb 2005
SY10/100H6xxLJC & LJC TR	SY10/100H6xxLJZ & LJZ TR	PLCC/Matte-Sn	Feb 2005
SY10/100H6xxJC & JC TR	SY10/100H6xxJZ & JZ TR	PLCC/Matte-Sn	Feb 2005
SY100HA6xxxJC & JC TR	SY100HA6xxxJY & JY TR	PLCC/Matte-Sn	Feb 2005
SY100HA6xxxJI & JI TR	SY100HA6xxxJY & JY TR	PLCC/Matte-Sn	Feb 2005
SY10/100H8xxLJC & LJC TR	SY10/100H8xxLJZ & LJZ TR	PLCC/Matte-Sn	Feb 2005
SY10/100H8xxJC & JC TR	SY10/100H8xxJZ & JZ TR	PLCC/Matte-Sn	Feb 2005

<b>Existing: Sn-Pb Package Ordering Code</b>	<b>Addition: Pb-Free Package Ordering Code</b>	<b>Pkg/Pb-Free Material</b>	<b>Product Available</b>
SY55xxxUTI & UTI TR	SY55xxxUTG & UTG TR	32-TQFP/NiPdAu	Jul 2005
SY55xxxLMI & LMI TR	SY55xxxLMG & LMG TR	32-MLF/NiPdAu	Dec 2004
SY55xxxVKI & VKI TR	SY55xxxVKG & VKG TR	10-MSOP/NiPdAu	Jan 2005
SY55xxxUKI & UKI TR	SY55xxxUKG & UKG TR	10-MSOP/NiPdAu	Jan 2005
SY55xxxUYI & UYI TR	SY55xxxUYG & UYG TR	16-QSOP/NiPdAu	Jul 2005
SY55xxxUHI & UHI TR	SY55xxxUHG & UHG TR	32-TQFP/NiPdAu	Jul 2005
SY58xxxUMI & UMI TR	SY58xxxUMG & UMG TR	16-MLF/NiPdAu	Dec 2004
SY58xxxUMI & UMI TR	SY58xxxUMG & UMG TR	32-MLF/NiPdAu	Dec 2004
SY58xxxUMI & UMI TR	SY58xxxUMG & UMG TR	44-MLF/NiPdAu	Dec 2004
SY892xxUMI & UMI TR	SY892xxUMG & UMG TR	16-MLF/NiPdAu	Dec 2004
SY892xxUMI & UMI TR	SY892xxUMG & UMG TR	32-MLF/NiPdAu	Dec 2004
SY892xxVMI TR	SY892xxVMG TR	8-MLF/NiPdAu	Dec 2004
SY893xxVMI TR	SY893xxVMG TR	8-MLF/NiPdAu	Dec 2004
SY893xxLMI TR	SY893xxLMG TR	8-MLF/NiPdAu	Dec 2004
SY894xxVZC & VZC TR	SY8942xVZH & VZH TR	All SOIC/NiPdAu	Mar 2005
SY894xxVJC & VJC TR	SY894xxVZZ & VZZ TR	28-PLCC/Matte-Sn	Feb 2005
SY89429AJC & AJC TR	SY89429AJZ & AJZ TR	28-PLCC/Matte-Sn	Feb 2005
SY89808LTI & LTI TR	SY89808LTG & LTG TR	32-TQFP/NiPdAu	Jul 2005
SY89809LTC & LTC TR	SY89809LHH & LHH TR	32-TQFP/NiPdAu	Jul 2005
SY8982xLHC & LHC TR	SY8982xLHH & LHH TR	64-TQFP/NiPdAu	Jul 2005
SY8982xUHI & UHI TR	SY8982xUHG & UHG TR	64-TQFP/NiPdAu	Jul 2005
SY89830UK4I & UK4I TR	SY89830UK4G & UK4G TR	16-TSSOP/NiPdAu	Dec 2005
SY8983xUMI & UMI TR	SY8983xUMG & UMG TR	16-MLF/NiPdAu	Dec 2005
SY8983xLMI & LMI TR	SY8983xLMG & LMG TR	16-MLF/NiPdAu	Dec 2005
SY8987xUMI & UMI TR	SY8987xUMG & UMG TR	16-MLF/NiPdAu	Dec 2005
SY8987xLMI & LMI TR	SY8987xLMG & LMG TR	16-MLF/NiPdAu	Dec 2005
SY8984xUMI & UMI TR	SY8984xUMG & UMG TR	16-MLF/NiPdAu	Dec 2005
SY8953xLHC & LHC TR	SY8953xLHH & LHH TR	64-TQFP/NiPdAu	Jul 2005
SY8954xUMI & UMI TR	SY8954xUMG & UMG TR	16-MLF/NiPdAu	Dec 2005
SY8954xLMI & LMI TR	SY8954xLMG & LMG TR	16-MLF/NiPdAu	Dec 2005
SY8954xUMI & UMI TR	SY8954xUMG & UMG TR	32-MLF/NiPdAu	Dec 2004
SY8954xLMI & LMI TR	SY8954xLMG & LMG TR	32-MLF/NiPdAu	Dec 2004
SY8954xUMI & UMI TR	SY8954xUMG & UMG TR	44-MLF/NiPdAu	Dec 2004
SY88902KC & KC TR	SY88902KH & KH TR	10-MSOP/NiPdAu	Dec 2004
SY88905KC & KC TR	SY88905KH & KH TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxKC & KC TR	SY88xxxKG & KG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxVKC & VKC TR	SY88xxxVKG & VKG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxVKI & VKI TR	SY88xxxVKG & VKG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxAVKC & AVKC TR	SY88xxxAVKG & AVKG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxAVKI & AVKI TR	SY88xxxAVKG & AVKG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxAVKEC & AVKEC TR	SY88xxxAVKEG & AVKEG TR	10-MSOP/NiPdAu	Mar 2005
SY88xxxLMI & LMI TR	SY88xxxLMG & LMG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxLKI & LKI TR	SY88xxxLKG & LKG TR	10-MSOP/NiPdAu	Dec 2004
SY88xxxVMI & VMI TR	SY88xxxVMG & VMG TR	10-MSOP/NiPdAu	Dec 2004
SY87xxxVZC & VZC TR	SY87xxxVZH & VZH TR	28-SOIC/NiPdAu	Mar 2005
SY87xxxLHI & LHI TR	SY87xxxLHG & LHG TR	32-TQFP/NiPdAu	Mar 2005
SY69xxxLHI & LHI TR	SY69xxxLHG & LHG TR	32-TQFP/NiPdAu	Mar 2005

**Products that are currently Pb-free and will change from Matte Tin to NiPdAu with Bromine free mold compound. Code Y to G.**

Current Pb-free/ROHS compliant part number	New "Green" Part Number
SY55854UYC TR	SY55854UGC TR
SY88904YC	SY88904GC
SY88904YC TR	SY88904GC TR
SY55854UYI	SY55854UGI
SY55854UYI TR	SY55854UGI TR
SY100EL16VCKY	SY100EL16VCKG
SY100EL16VCKY TR	SY100EL16VCKG TR
SY100EL16VKY	SY100EL16VKG
SY100EL16VKY TR	SY100EL16VKG TR
SY88923AVKEY	SY88923AVKEG
SY88923AVKY	SY88923AVKG
SY89851UMY	SY89851UMG
SY89540UMY	SY89540UMG
SY89854UMY	SY89854UMG
SY88782LMY	SY88782LMG
SY89852UMY	SY89852UMG
SY89202UMY	SY89202UMG
SY89838UMY	SY89838UMG
SY89112UMY	SY89112UMG
SY89545LMY	SY89545LMG
SY88993AVKY	SY88993AVKG
SY100ELT22ZY	SY100ELT22ZG
SY89856UMY	SY89856UMG
SY89858UMY	SY89858UMG
SY88782LMY TR	SY88782LMG TR
SY89202UMY TR	SY89202UMG TR
SY89540UMY TR	SY89540UMG TR
SY89838UMY TR	SY89838UMG TR
SY89850UMY TR	SY89850UMG TR
SY89851UMY TR	SY89851UMG TR
SY89854UMY TR	SY89854UMG TR
SY89840UMY	SY89840UMG
SY89833LMY	SY89833LMG
SY100ELT22LZY	SY100ELT22LZG
SY100ELT23LZY	SY100ELT23LZG
SY100ELT23LZY TR	SY100ELT23LZG TR
SY10EP05VKY	SY10EP05VKG
SY10EP05VKY TR	SY10EP05VKG TR
SY89841UMY	SY89841UMG
SY89842UMY	SY89842UMG
SY58040UMY	SY58040UMG
SY88973AVMY	SY88973AVMG
SY88973AVMY TR	SY88973AVMG TR
SY89833LMY TR	SY89833LMG TR
SY100ELT22LZY TR	SY100ELT22LZG TR
SY58040UMY TR	SY58040UMG TR
SY89840UMY TR	SY89840UMG TR
SY89841UMY TR	SY89841UMG TR
SY89842UMY TR	SY89842UMG TR
SY89856UMY TR	SY89856UMG TR
SY89858UMY TR	SY89858UMG TR
SY88993AVKY TR	SY88993AVKG TR
SY100ELT22ZY TR	SY100ELT22ZG TR
SY89112UMY TR	SY89112UMG TR
SY89545LMY TR	SY89545LMG TR
SY88982LMY	SY88982LMG
SY88982LMY TR	SY88982LMG TR
SY89852UMY TR	SY89852UMG TR
SY58620LMY	SY58620LMG
SY58621LMY	SY58621LMG
SY88973VMY	SY88973VMG
SY58620LMY TR	SY58620LMG TR
SY58621LMY TR	SY58621LMG TR
SY88973VMY TR	SY88973VMG TR

## MICREL Pb-Free/ROHS Compliant Option Table

	"Green" Package	Pb-free, ROHS Compliant	Standard Product		
			Analog	HBW	Ethernet
<b>Part Numbers</b>			MICxxxxx	Syxxxxx	KSxxxxx
<b>Maximum IR Reflow Temperature</b>	260C	260C	240C*		
<b>Mold Compound Composition</b>	<b>Without</b> Organic Bromide/SbO3	May contain organic bromide/SbO3	May contain organic bromide/SbO3		
<b>Lead Finish</b>	Pd/Ni/Au	PdNiAu <b>or</b> 100% matte Sn	Pd/Ni/Au <b>or</b> Sn/Pb (85/15 or 8020)		
<b>Temperature Code and PB Free Mark**</b>					
<b>Commercial</b>	<b>H</b>	<b>Z</b>	<b>C</b>	<b>C</b>	<b>no code</b>
<b>Industrial</b>	<b>G</b>	<b>Y</b>	<b>B</b>	<b>I</b>	<b>I</b>
<b>Military</b>	<b>F</b>	<b>X</b>	<b>A</b>	<b>-</b>	<b>-</b>
<b>Industrial ROHS Compliant with high melting Pb/Sn solder die attach</b>		<b>W</b>			
* - Many standard products will withstand 260C. Check with the factory if this is a requirement					
** - For Ethernet the Pb-free mark will be the letter following the KS prefix (e.g. KSZ8721BL). For Analog and HBW the letter designated for operating temperature range in the standard part marking will be replaced by the appropriate Pb-free temperature code.					