CHANGE NOTIFICATION

LINEAR TECHNOLOGY

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April 30, 2013

Dear Sir/Madam: PCN# 043013

Subject: Advisory Notification of LTC2978 recommended replacements

This notice is to advise LTC2978 customers of a recommended drop-in replacement for existing designs. Customers are advised to replace all LTC2978 designs with the LTC2978A which addresses the TUE and DAC Linearity Improvements and fixes the DAC Disconnect Timing Issue (see attached LTC2978A migration guide) uncovered in the existing LTC2978 design.

The new device has the same guaranteed electrical specifications as the existing product, and is fully pin-and-software-compatible. Linear Technology recommends all customers qualify the new LTC2978A device for existing designs and use in ongoing production.

The LTC2978 will still be available in production but will no longer be recommended for new designs. The LTC2978A is distinguished from the original LTC2978 with the LTC2978A top mark and MFR_SPECIAL_ID = 0x0124.

Please note that for new designs, we recommend the improved LTC2977 as outlined in the attached LTC2977 migration guide. The table below outlines the mapping of the affected part numbers to the new, recommended part numbers.

Affected Part Number	Recommended for Existing Designs	Recommended for New Designs
LTC2978CUP#PBF	LTC2978ACUP#PBF	LTC2977CUP#PBF
LTC2978IUP#PBF	LTC2978AIUP#PBF	LTC2977IUP#PBF

Should you have any further questions, please feel free to contact me at 408-432-1900 ext. 2519, or by email at NGIRN@LINEAR.COM.

Sincerely,

Naib Girn
Quality Assurance Manager

INTRODUCTION

The LTC®2978A is a 100% pin- and configuration-compatible upgrade to the LTC2978, addressing several issues that cause the LTC2978 to operate differently than described in the data sheet.

DESCRIPTION

The LTC2978A addresses the following issues in the LTC2978. Contact Linear Technology for more detailed errata.

Total Unadjusted Error (TUE) Improvement

The LTC2978A has improved long-term Total Unadjusted Error (TUE).

DAC Linearity Improvement

The LTC2978A improves the DAC linearity under certain process corners at high output and common-mode levels, and hot temperature.

DAC Disconnect Timing Issue

The LTC2978A contains an improved state machine that is immune to a rare clock alignment present in the LTC2978 under certain system configurations, potentially causing the voltage servo DACs to not disconnect when a channel turns off.

PIN CONFIGURATION

The pin configuration of the LTC2978A is 100% compatible with the LTC2978. No changes to existing hardware are required to migrate from the LTC2978 to the LTC2978A.

ELECTRICAL CHARACTERISTICS

The electrical characteristics of the LTC2978A are the same as the LTC2978.

CONFIGURATION FILE

The configuration file for the LTC2978A is the same as the LTC2978, with the following exception:

Read-Only Commands

The following read-only command returns different values on the LTC2978 and LTC2978A. No configuration file changes are required, but interpretation of the value must be changed accordingly.

	LTC2978	LTC2978A
MFR_SPECIAL_ID (0xE7)	0x0122	0x0124

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INTRODUCTION

The LTC®2977 is a 100% pin-compatible upgrade to the LTC2978/LTC2978A featuring longer TON and TOFF delays, improved power-up and power good timing specifications, more fault management options, and other enhancements. This guide describes the differences and explains the configuration file changes needed when migrating a design from the LTC2978/LTC2978A to the LTC2977.

FEATURE COMPARISON

		LTC2978/LTC2978A	LTC2977
Sequencing	Time Based	✓	✓
	Tracking*		✓
Maximum Programmable TON_DELAY/TOFF_DELAY		0.655 Sec	13.1 Sec
Sequence Off Upon Fault			✓
Power Good De-Assertion Time		100ms	12µs or 100ms
Power-Up Time		135ms (Typ)	30ms (Typ)
Fault Retry Count Options		0 or ∞	0 to 6, or ∞
Fast Fault Log Mode			✓
EEPROM Bulk Programming (Without Affecting RAM)			✓
Pollable MFR_COMMON Register When Device Is Busy			✓
Command Plus			✓

*Note: Enables use of tracking DC/DC converters. Does not control ramp rates.

PIN CONFIGURATION

The pin configuration of the LTC2977 is 100% compatible with the LTC2978/LTC2978A. No changes to existing hardware are required to migrate from the LTC2978/LTC2978A to the LTC2977.

ELECTRICAL CHARACTERISTICS

The electrical characteristics of the LTC2977 are the same as the LTC2978/LTC2978A with the following exceptions:

	LTC2978/LTC2978A	LTC2977
Operating Temperature Range	–40°C to 85°C	–40°C to 105°C
Storage Temperature Range	–40°C to 125°C	–40°C to 150°C
GAIN_ADC (Current Sense Mode) Maximum	±0.2%	±0.35%*

*Note: Due to the higher operating temperature range of the LTC2977.

CONFIGURATION FILE

The following PMBus commands are new or have changed in the LTC2977. An automatic conversion utility is provided in LTpowerPlay™ to simplify the transition from an LTC2978/LTC2978A configuration file to a functionally equivalent LTC2977 configuration file.

Writable Commands

	LTC2978/LTC2978A	LTC2977
MFR_CONFIG_ALL (0xD1)	Byte Command	Word Command

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CONFIGURATION FILE

For maximum compatibility with legacy LTC2978/LTC2978A designs, the new MFR_CONFIG_ALL bits [15:8] should be written to zero. This will disable short-cycle fault detection, fast PWRGD de-assertion, and fast fault logging. Note that factory programmed LTC2977 devices will have these features enabled by default.

	LTC2978/LTC2978A	LTC2977
MFR_CONFIG (0xD0), Bits [15:14]	Reserved	Mfr_config_chan_mode

For maximum compatibility with legacy LTC2978/LTC2978A designs, the new MFR_CONFIG bits [15:14] should be written to zero.

	LTC2978/LTC2978A	LTC2977
User Scratch Value	MFR_SPARE_0 (0xF7)	USER_DATA_04 (0xB4)
User Scratch Value	MFR_SPARE_2 (0xF9)	USER_DATA_03 (0xB3)
Retry Count	N/A	MFR_RETRY_COUNT (0xF7)

The unpaged data in MFR_SPARE_0 has been moved to USER_DATA_04. The 8-paged data in MFR_SPARE_2 has been moved to USER_DATA_03. The command code 0xF7 is used by the LTC2977 for the new MFR_RETRY_COUNT feature.

	LTC2978/LTC2978A	LTC2977
USER_DATA_00 (0xB0)	NACK	Reserved
USER_DATA_01 (0xB1)	NACK	Reserved
USER_DATA_02 (0xB2)	NACK	Reserved
MFR_LTC_RESERVED_1 (0xB5)	NACK	Reserved
MFR_LTC_RESERVED_2 (0xBC)	NACK	Reserved
MFR_EE_UNLOCK (0xBD)	NACK	New: EEPROM Bulk Access
MFR_EE_ERASE (0xBE)	NACK	New: EEPROM Bulk Access
MFR_EE_DATA (0xBF)	NACK	New: EEPROM Bulk Access
MFR_COMMAND_PLUS (0xC0)	NACK	New: Command Plus
MFR_DATA_PLUS0 (0xC1)	NACK	New: Command Plus
MFR_DATA_PLUS1 (0xC2)	NACK	New: Command Plus

These commands will NACK on the LTC2978/LTC2978A. The LTC2977 assigns new functionality to these commands. Consult the LTC2977 data sheet for more information.

Read-Only Commands

The following read-only commands return different values on the LTC2977 and LTC2978/LTC2978A. No configuration file changes are required, but interpretation of the values must be changed accordingly.

	LTC2978	LTC2978A	LTC2977
CAPABILITY (0x19)	0xE0	0xE0	0xB0
MFR_SPECIAL_ID (0xE7)	0x0122	0x0124	0x0130
MFR_COMMON (0xEF)	Bits [7:2] may return different values		

	LTC2978/LTC2978A	LTC2977
MFR_STATUS_2 (0xB7)	NACK	New
MFR_TELEMETRY (0xCF)	NACK	New

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