STA400A

XMRADIO® SDARS CHANNEL DECODER

DATA BRIEF

Features:

Front End Interface

- Two Internal 10 bit A/D converters
- Two QPSK demodulators for satellite branch
- One multicarrier demodulator for terrestrial branch
- Satellite symbol frequency: 1.64 MBaud
- Terrestrial symbol frequency: 2.99 MBaud
- Digital root raised cosine Nyquist filter: 15% roll-off
- FFT length: 768 sub-carriers
- Full digital carrier and frequency recovery and tracking loops
- Frequency inversion compensation for high-side/low-side mixer injection
- Lock detectors, C/N indicator, on chip BER estimators
- Two digital AGCS: internal signal power estimation and filtering
- 1 bit PDM AGCS control signal outputs

TDM Decoding and Management

- Satellite and Terrestrial Frame Synchronization
- Satellite Phase Ambiguity Resolution
- TDM demultiplexing
- Prime Rate Channel (PRC) demultiplexing
- External memory controlling

Forward Error Correction

- Viterbi decoder: K=7, R=1/3

TQFP144
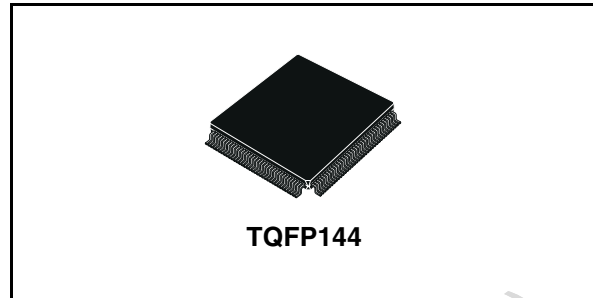
- Satellite depuncturing: Rate 3/4
- Terrestrial depuncturing: Rate 3/5
- Convolutional time deinterleaver over 4.7 sec
- Block Deinterleaver over 2 PS blocks
- Reed-Solomon decoder (255,223). Up to 16 bytes correction capability.
- Energy dispersal descrambler
- Sat-Sat and Terr-Sat diversity combining

Back End Interface

- Two payload channel bitstream interfaces
- Payload channel selection logic
- Designed to work with the STA450A service and source decoder

Low Power Technology

- 1.8V, 0.18μm technology
- 3.3V capable I/Os

Control

- IIC-BUS Slave Control Interface
- Device address: 1101010

Order codes

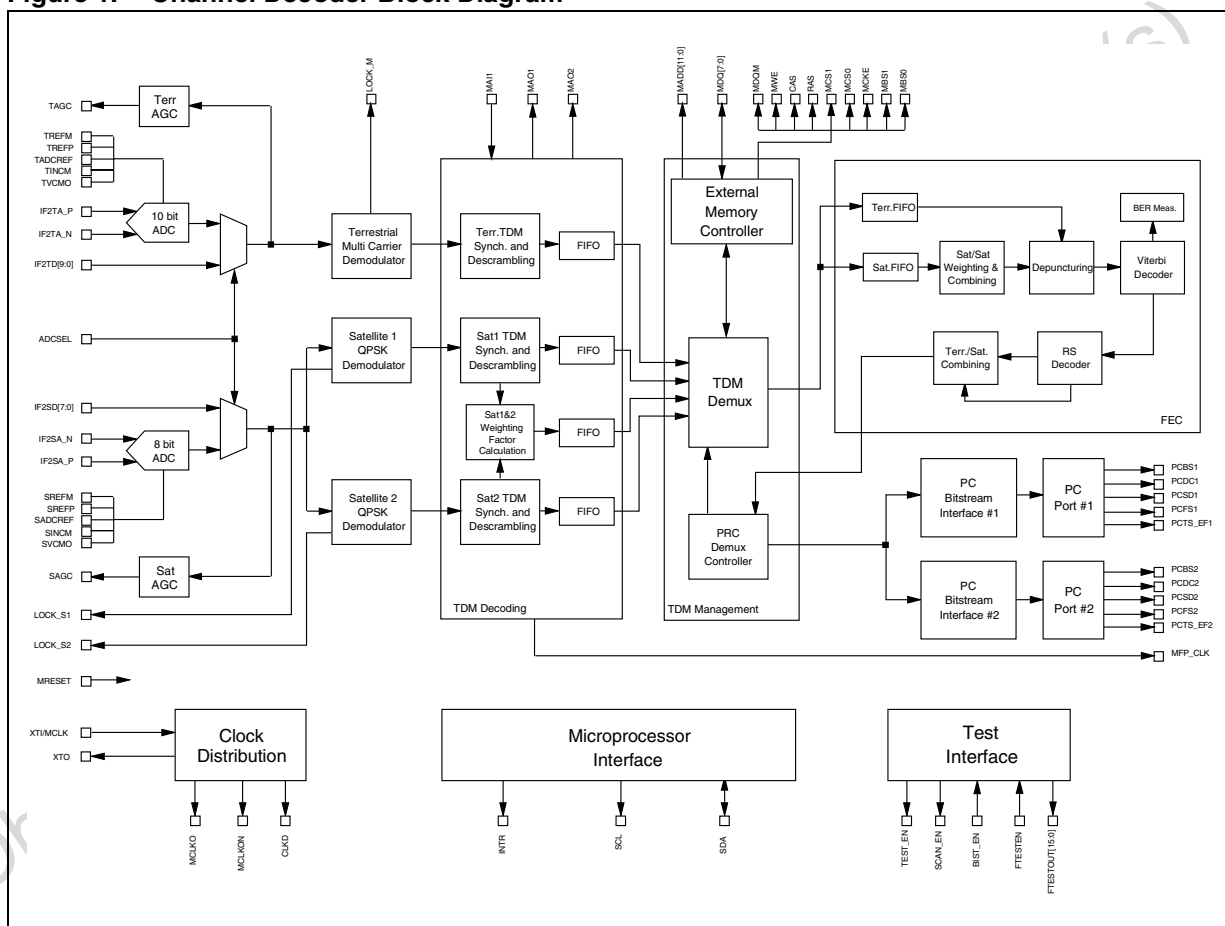| Part number	Temp range, °C	Package	Packing
STA400A	-40 to +85	TQFP144	Tube
STA400A13TR	-40 to +85	TQFP144	Tape & reel

October 2005

Rev 1

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1   Description

The SDARS is a satellite transmission system based on two geostationary satellites on the East and West coasts of the Continental United States (CONUS). In the urban areas, where the line of sight reception of the satellites is difficult or not possible, the service is covered by terrestrial repeaters adopting a MultiCarrier Modulation scheme.

Designed for digital radio receivers compatible with the XMRadio SDARS System, the STA400A Channel Decoder integrates all the functions to demodulate and decode the incoming satellite and terrestrial signals after the RF Front-End down-convertions: Analog-to-Digital conversions, satellite and terrestrial demodulations, AGCs, frame synchronization and demultiplexing, Viterbi decoding, time and spatial diversity combining, Reed-Solomon decoding and deinterleaving, Prime Rate Channel (PRC) demultiplexing, Payload Channel (PC) selection.
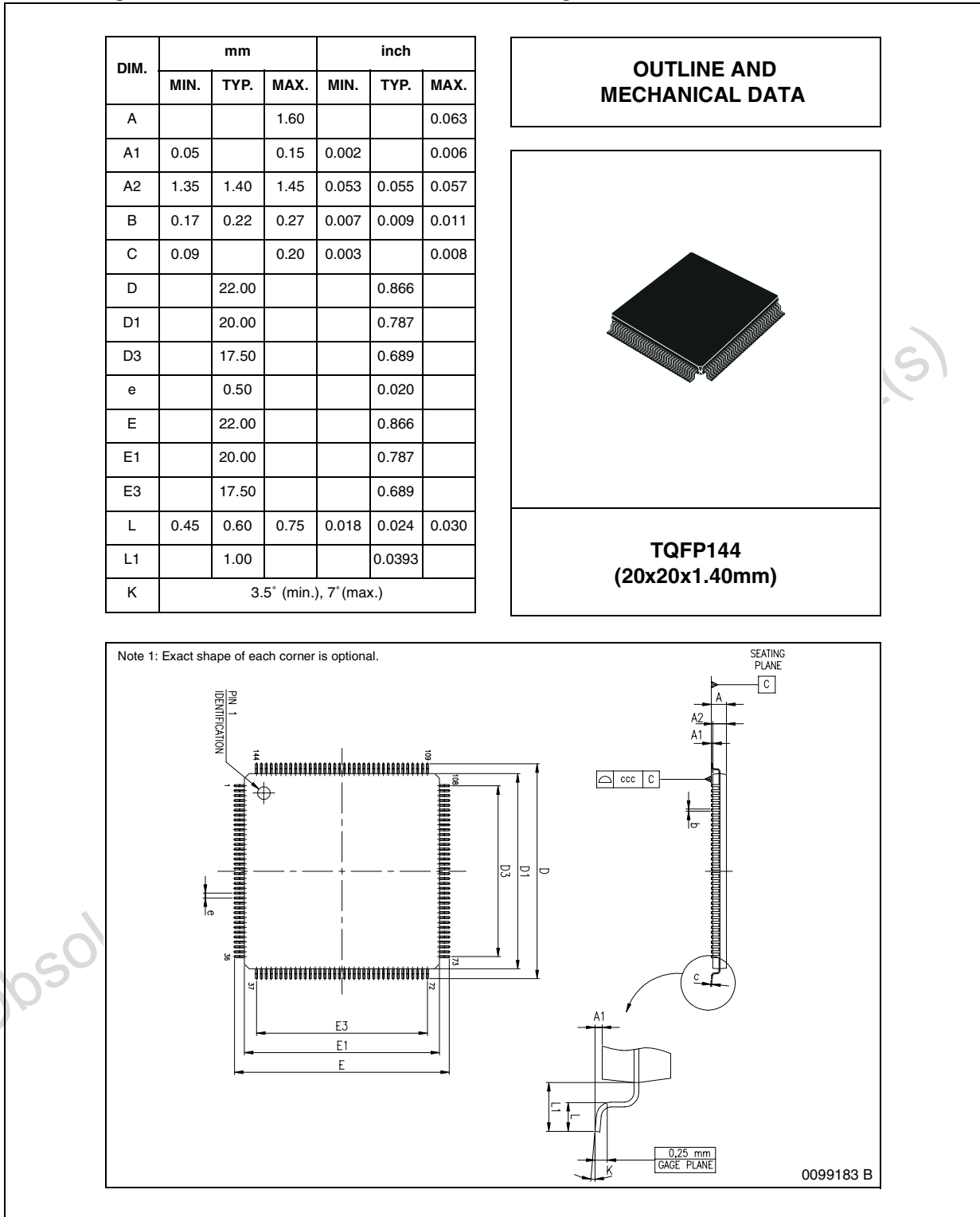
At the end of the demodulation and decoding processes a configurable serial data stream is made available to STA450A, the Service/Source Decoder, via the PC BitStream interface

Figure 1.   Channel Decoder Block Diagram

2 Package information

Figure 2. TQFP144 Mechanical Data & Package Dimensions

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.60			0.063
A1	0.05		0.15	0.002		0.006
A2	1.35	1.40	1.45	0.053	0.055	0.057
B	0.17	0.22	0.27	0.007	0.009	0.011
C	0.09		0.20	0.003		0.008
D		22.00			0.866	
D1		20.00			0.787	
D3		17.50			0.689	
e		0.50			0.020	
E		22.00			0.866	
E1		20.00			0.787	
E3		17.50			0.689	
L	0.45	0.60	0.75	0.018	0.024	0.030
L1		1.00			0.0393	
K	3.5˚ (min.), 7˚ (max.)					

OUTLINE AND MECHANICAL DATA

TQFP144 (20x20x1.40mm)

Note 1: Exact shape of each corner is optional.

0099183 B

3 Revision history

Date	Revision	Changes
10-Oct-2005	1	Initial release.

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