



F 19 SERVICE MANUAL

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There are two different types of **F19** chassis that are equipped with two different microcontroller.

These microcontroller are known as ETT having a code SAA5297A and PAINTER with a code number SAA5553.

From the point of view of the application on the F19 chassis the two type of microcontroller are substantially having the same performances, the same pin-out , the same firmware but they are not interchangeable as the power supply are different.

In case of SAA5297A the power supply is 5 V for the SAA5553 is 3.3 V.

Even if the two devices are non interchangeable the two chassis can be interchanged as the in/out interface are exactly the same.

As the specifications of the two devices are the same and the first version of the chassis was equipped with the SAA5297A , in this document the characteristics of it are very much detailed meanwhile there is a very short description (as an addendum at the end) for the SAA5553.

F19 CHASSIS DESCRIPTION

Summary

The **F19** is a chassis suitable to drive CRT having both 4 by 3 and 16 to 9 aspect ratio and dimension from 25" up to 34".

As we can see from the block diagram the chassis is equipped with the most recent Integrated Circuit like the one chip TV processor TDA884x that does include all the low level signal processing including Video, Audio, synchronisation process, and chroma decoder . (see more detail at the "TDA884x FAMILY SPECIFICATION" paragraph), and the Sound Processor TDA9875A that perform all sound function including digital decoding of NICAM signals. (see more detail at the " TDA9870A & tda9875A MAIN CHARACTERISTICS" paragraph).

The above mentioned devices are driven by an Integrated Circuit that does include the microcontroller function with 64 K ROM and the TELETEXT acquisition and 8 pages RAM. (SAA5297A)

In the **F19** chassis there are, besides the stereo one, two possible module that are performing "FEATURES" like PIP (picture in picture) and / or CTI (colour transients improvement) and 4 by 3 to 16 by 9 signal processing. One further module is dedicated to the so called "Zero Power Stand By"

A 26 Key Remote Control is performing the full control for the end- user but can also be used in " SERVICE MODE" to control and adjust, without open the back cover of the TV set all the necessary functions.

With the 5 "LOCAL KEY BOARD" button all the end user function can also be performed

When the TV set is equipped with a PLL tuner the microcontroller recognise it and the tuning method became a frequency synthesis system if not it work as a voltage tuning system (provided all necessary components are mounted)

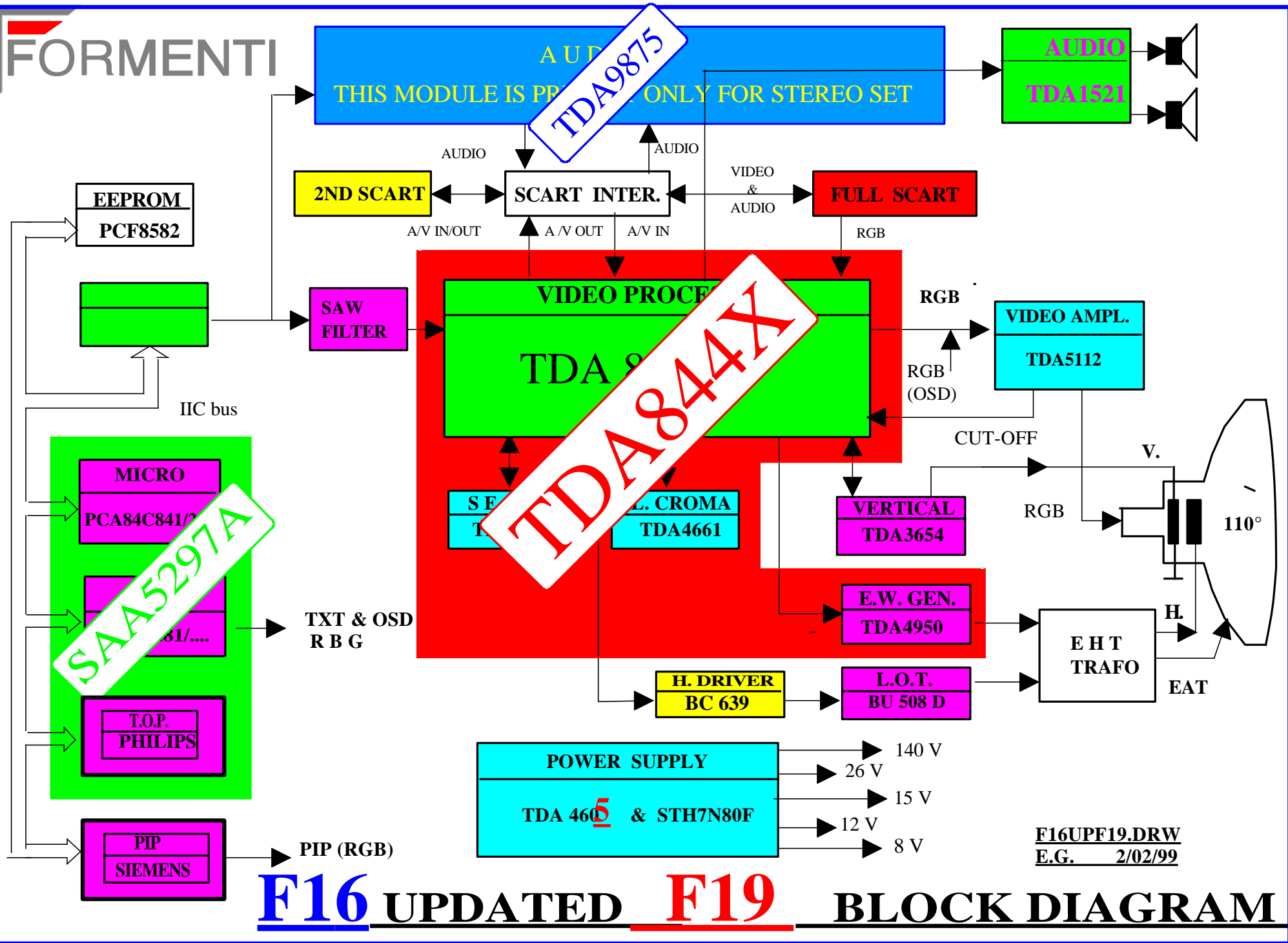
The TV make use of a multilevel MENU (activated both by the Remote Control and Local Keyboard) using five selectable languages (Italian, German, English, France, end Spanish) with which it is possible to control sequentially all video and sound value, to adjust several parameter like picture format, sound response, sleep timer etc., and to set others important parameter like standard, select country for automatic tuning and sort etc.

Here below a list of the characteristics of the TV se

TV SET CHARACTERISTICS (MONO & STEREO)

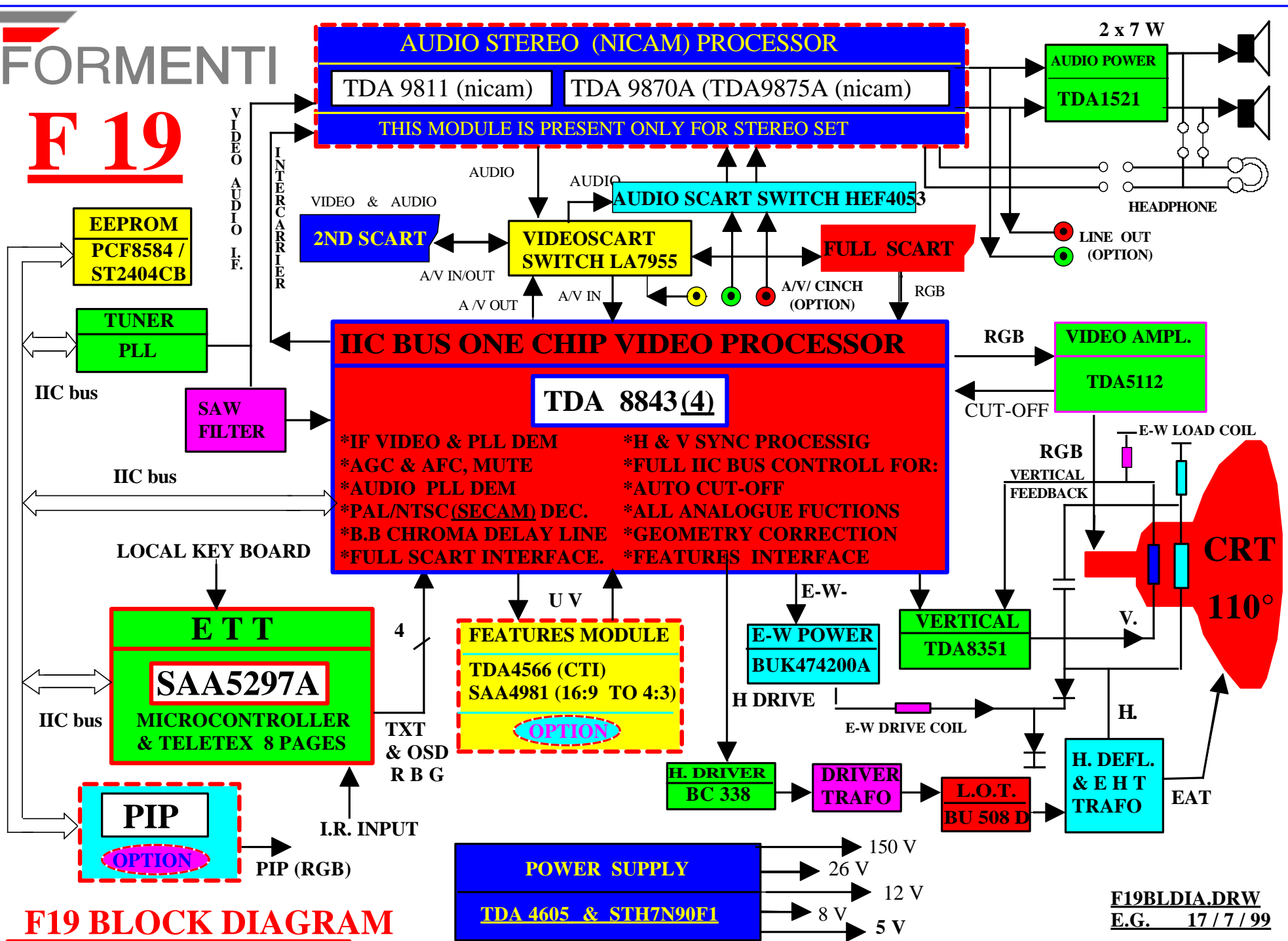
PICTURE TUBE SIZE :	
• 4 : 3 ASPECT RATIO	21" / 25" / 28" / 29" / 34"
• 16 : 9 ASPECT RATIO	28 " / 32"
• STANDARD	
• R.F. (ANTENNA) (FOR FREQ. SYNTH.)	CCIR (B / G / L / L' / D / K / I)
• VIDEO (SCART & CINCH)	B / G / L / L' / D / K / I / M / N
• COLOUR (MAX. THREE STANDARDS)	PAL / SECAM / NTSC
• SOUND STANDARD:	B / G / L / L' / D / K / I
* MONO	AM & FM
* STEREO	A2 OR NICAM
TUNING SYSTEM SELECTABLE :	FACTORY OPTION
<u>FREQUENCY SYTHETIZER</u>	
• TOTAL AVAILABLE CHANNEL NUMBER	200
• CHANNEL IN ONE RF STANDARD UP TO	100
• NUMBER OF PROGRAM	100
• DIRECT PROGRAM & CHANNEL CALL WITH	1, OR 2 OR 3 DIGIT
• PROGRAM & CHANNEL STEP UP AND DOWN	YES
• VOLTAGE SYNTHESISER	
• CABLE & HYPERBAND CHANNEL	YES
• SWITCHABLE AFC	YES
• AUTOMATIC SEARCH TUNING	YES
• A S T WITH AUTO SORT	YES
AUDIO SECTION	
<u>POWER</u>	
• MONO	6 W RMS.
• STEREO	2 x 6 W RMS.
<u>EXTERNAL CONNECTION</u>	
• HEADPHONE	STEREO SET ONLY
• LOUDSPEAKERS	INTERNAL L.S. SWITCHED
A / V INPUT / OUTPUT	
• FRONT PANEL CINCH	A / V INPUT
• I FULL SCART (CVBS, STEREO, RBA)	MULTIMEDIA INPUT OUTPUT
• SCART (CVBS & STEREO IN / OUT)	VCR, HI.FI, SATELLITE, ETC
• SCART A TO SCART B LOOP THROUGH	FOR PROGRAMS DUBBING
TXT	PANEUROPEAN CHARACTER SET
• LEVEL 1	8 PAGES
• LEVEL 1,5 (FASTEXT)	7 PAGES
FEATURES	
• CTI (COLOUR TRANSIENT IMPROVEMENT)	OPTION
• 16:9 TO 4:3 VIDEO COMPRESSION	ONLY FOR 16:9 TV SET
• VERTICAL ZOOM OUT	3 LEVEL
• MENU DRIVEN SYSTEM	
• EASY TO USE REMOTE CONTROL	
• REMOTE CONTROL WITH "SERVICE" USE	NOT ACCESSIBLE TO END USER
• PIP	OPTION

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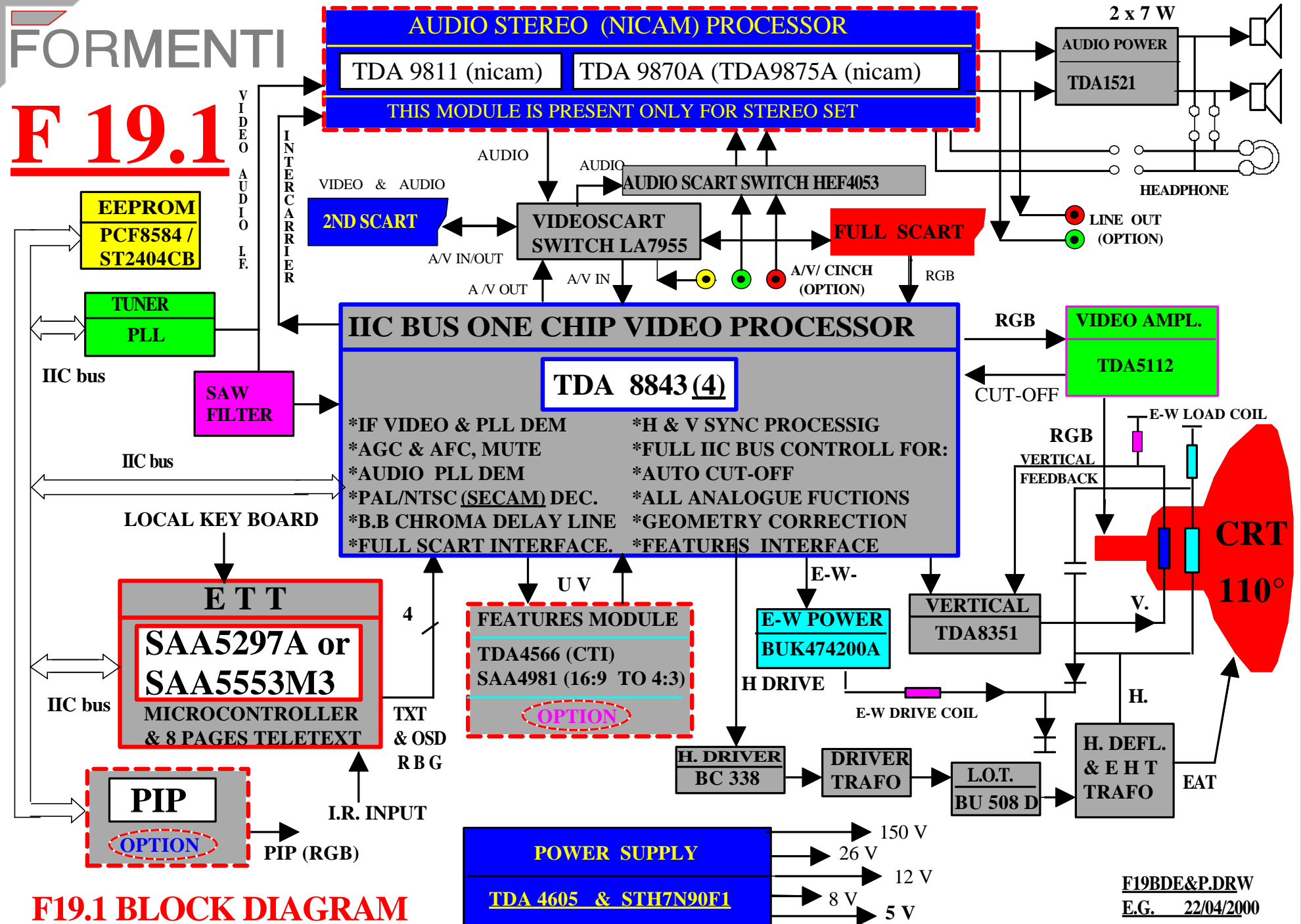


F19 BLOCK DIAGRAM

F19BLDIA.DRW
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F 19.1



F19.1 BLOCK DIAGRAM

F19BDE&P.DRW
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F19 TUNING

&

TELETEXT

SAA529XA FAMILY MAIN CHARACTERISTICS

FEATURES

General

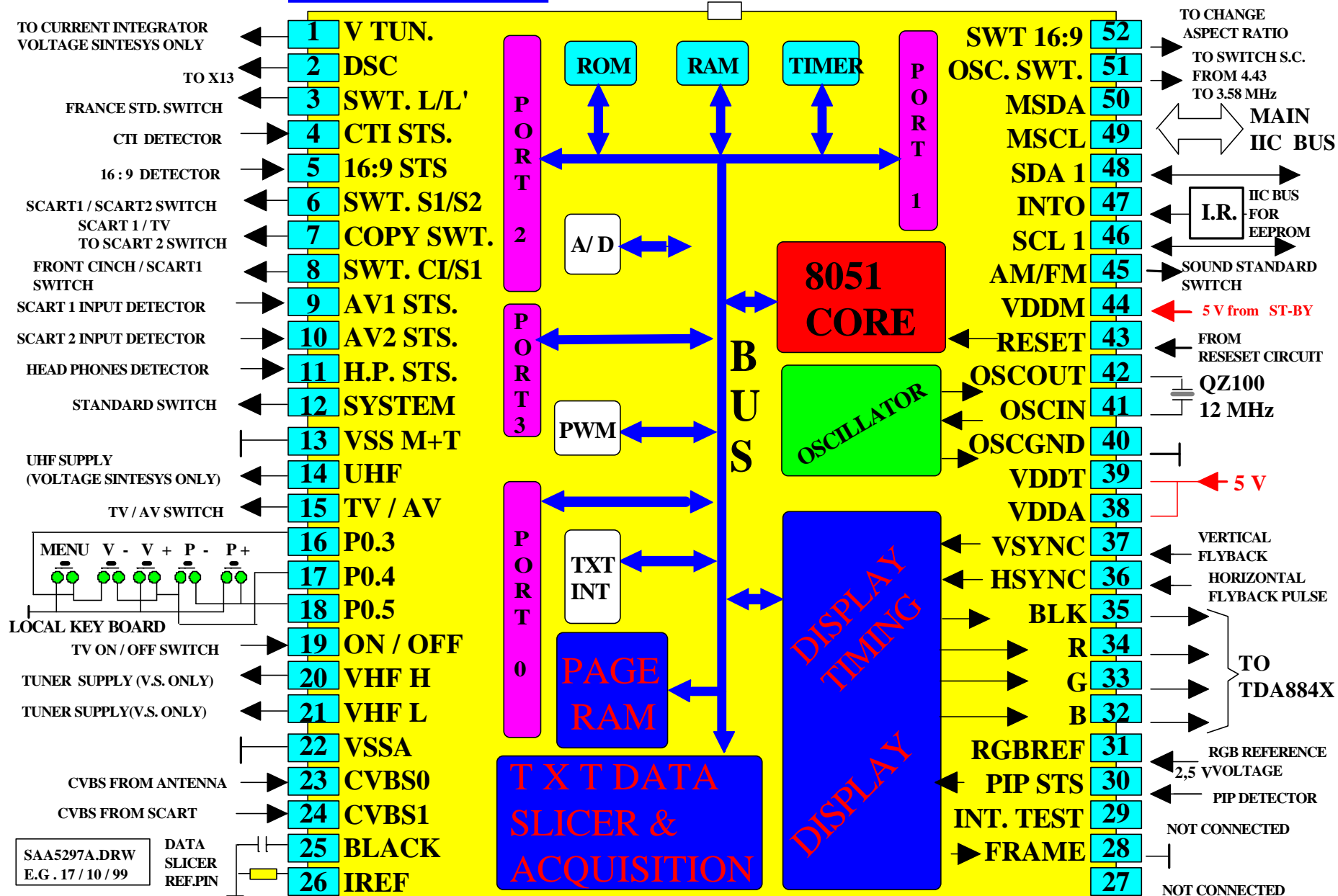
- Single chip microcontroller with integrated teletext decoder
- Single +5 V power supply
- Single crystal oscillator for teletext decoder, display and microcontroller
- Teletext function can be powered-down independent of microcontroller function for reduced power consumption in standby
- Pin compatibility throughout family.

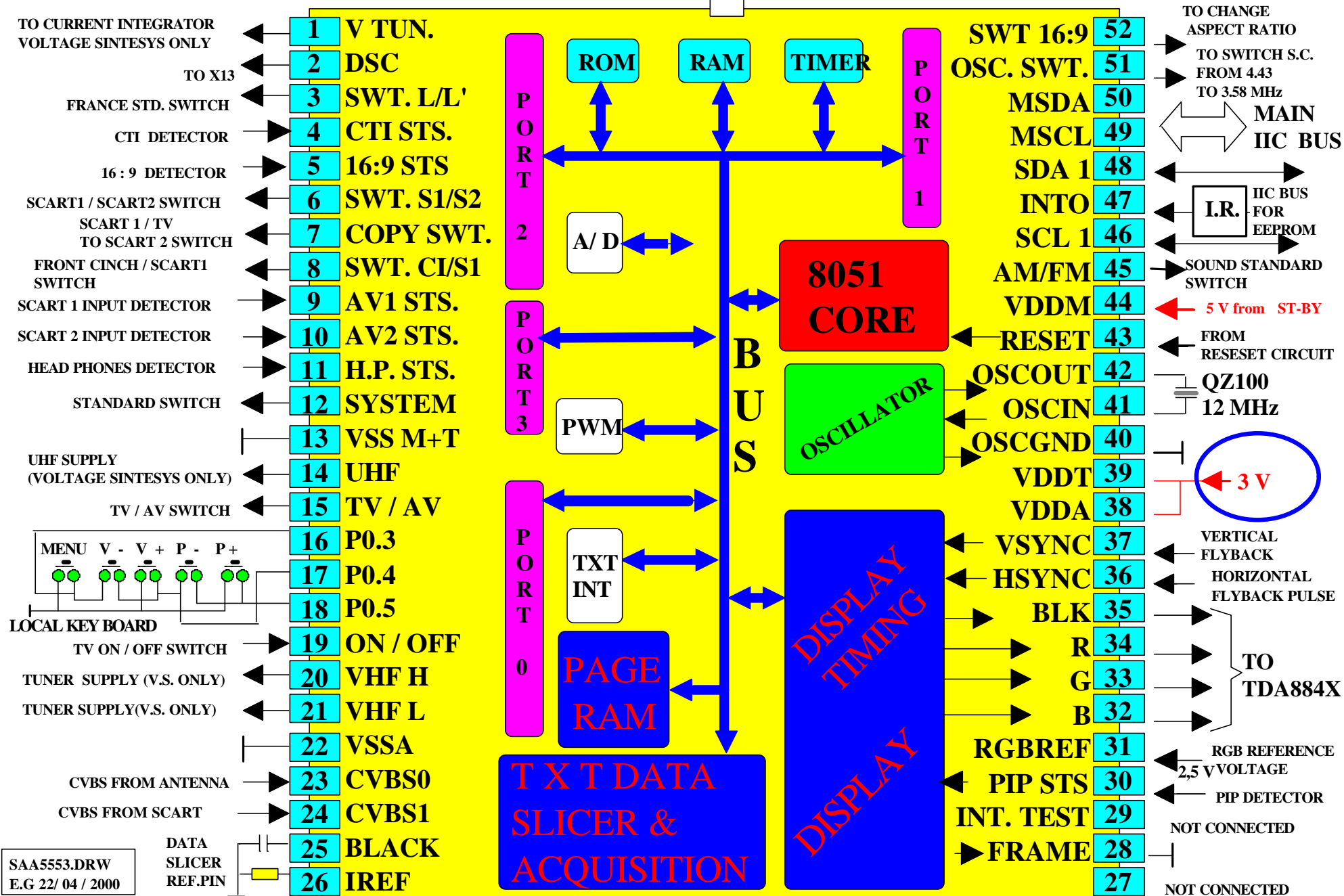
Microcontroller

- 80C51 microcontroller core
- 16/32/64 kbyte mask programmed ROM
- 256/768/1280 bytes of microcontroller RAM
- Eight 6-bit Pulse Width Modulator (PWM) outputs for control of TV analog signals
- One 14-bit PWM for Voltage Synthesis Tuner control
- Four 8-bit Analog-to-Digital converters
- 2 high current open-drain outputs for directly driving LEDs etc.
- 1 2 C-bus interface
- External ROM and RAM capability on QFP80 package version.

Teletext acquisition

- 1 page and 10 page Teletext version
- Acquisition of 525-line and 625-line World System Teletext, with automatic selection
- Acquisition and decoding of VPS data (PDC system A)
- Page clearing in under 64 s (1 TV line)
- Separate storage of extension packets (SAA5296/7, SAA5296/7A and SAA5496/7)
- Inventory of transmitted Teletext pages stored in the Transmitted Page Table (TPT) and Subtitle Page Table (SPT) (SAA5296/7, SAA5296/7A and SAA5496/7)
- Automatic detection of FASTEXT transmission





- Real-time packet 26 engine for processing accented (and other) characters
- Comprehensive Teletext language coverage
- Video signal quality detector.

Teletext Display

- 525-line and 625-line display
- 12 × 10 character matrix
- Double height, width and size On-Screen Display (OSD)
- Definable border colour
- Enhanced display features including meshing and shadowing
- 260 characters in mask programmed ROM
- Automatic FRAME output control with manual override
- RGB push-pull output to standard decoder ICs
- Stable display via slave synchronisation to horizontal sync and vertical sync.

Additional features of SAA529xA devices

- Wide Screen Signalling (WSS) bit decoding (line 23).

2 GENERAL DESCRIPTION

The SAA529x, SAA529xA and SAA549x family of microcontrollers are a derivative of the Philips' industry-standard 80C51 microcontroller and are intended for use as the central control mechanism in a television receiver. They provide control functions for the television system and include an integrated teletext function.

The teletext hardware has the capability of decoding and displaying both 525-line and 625-line World System Teletext. The same display hardware is used both for Teletext and On-Screen Display, which means that the display features give greater flexibility to differentiate the TV set.

The family offers both 1 page and 10 page Teletext capability, in a range of ROM sizes. Increasing display capability is offered from the SAA5290 to the SAA5497.

TELETEXT DECODER

Data slicer

The data slicer extracts the digital teletext data from the incoming analog waveform. This is performed by sampling the CVBS waveform and processing the samples to extract the teletext data and clock.

Acquisition timing

The acquisition timing is generated from a logic level positive-going composite sync signal VCS. This signal is generated by a sync separator circuit which adaptively slices the sync pulses. The acquisition clocking and timing are locked to the VCS signal using a digital phase-locked-loop. The phase error in the acquisition phase-locked-loop is detected by a signal quality circuit which disables acquisition if poor signal quality is detected.

Teletext acquisition

This family is capable of acquiring 625-line and 525-line World System Teletext see "World System Teletext and Data Broadcasting System". Teletext pages are identified by seven numbers: magazine (page hundreds), page tens, page units, hours tens, hours units, minutes tens and minutes units. The last four digits, hours and minutes, are known as the subcode, and were originally intended to be time related, hence their names.

For the ten page device, each packet can only be written into one place in the teletext RAM so if a page matches more than one of the page requests the data is written into the area of memory corresponding to the lowest numbered matching page request.

At power-up each page request defaults to any page, hold on and error check Mode 0.

Rolling headers and time

When a new page has been requested it is conventional for the decoder to turn the header row of the display green and to display each page header as it arrives until the correct page has been found.

Error checking

Before teletext packets are written into the page memory they are error checked. The error checking carried out depends on the packet number, the byte number, the error check mode bits in the page request data and the TXT1.8 BIT bit. If an uncorrectable error occurs in one of the Hamming checked addressing and control bytes in the page header or in the Hamming checked bytes in packet 8/30, bit 4 of the byte written into the memory is set, to act as an error flag to the software. If uncorrectable errors are detected in any other Hamming checked data the byte is not written into the memory.

Packet 26 processing

One of the uses of packet 26 is to transmit characters which are not in the basic teletext character set. The family automatically decodes packet 26 data and, if a character corresponding to that being transmitted is available in the character set, automatically writes the appropriate character code into the correct location in the teletext memory. This is not a full implementation of the packet 26 specification allowed for in level 2 teletext, and so is often referred to as level 1.5.

By convention, the packets 26 for a page are transmitted before the normal packets. To prevent the default character data overwriting the packet 26 data the device incorporates a mechanism which prevents packet 26 data from being overwritten.

Fastext detection

When a packet 27, designation code 0 is detected, whether or not it is acquired, the TXT13.FASTEXT bit is set. If the device is receiving 525-line teletext, a packet X/0/27/0 is required to set the flag. The flag can be reset by writing a logic 0 into the SFR bit.

When a packet 8/30 is detected, or a packet 4/30 when the device is receiving a 525-line transmission, the TXT13.Pkt 8/30 is set. The flag can be reset by writing a logic 0 into the SFR bit.

THE DISPLAY

Introduction

The capabilities of the display are based on the requirements of level 1 teletext, with some enhancements for use with locally generated on screen displays. The display consists of 25 rows each of 40 characters, with the characters displayed being those from rows 0 to 24 of the basic page memory. If the TXT7.STATUS ROW TOP bit is set row 24 is displayed at the top of the screen, followed by row 0, but normally memory rows are displayed in numerical order. The teletext memory stores 8 bit character codes which correspond to a number of displayable characters and control characters, which are normally displayed as spaces. The character set of the device is described in more detail below.