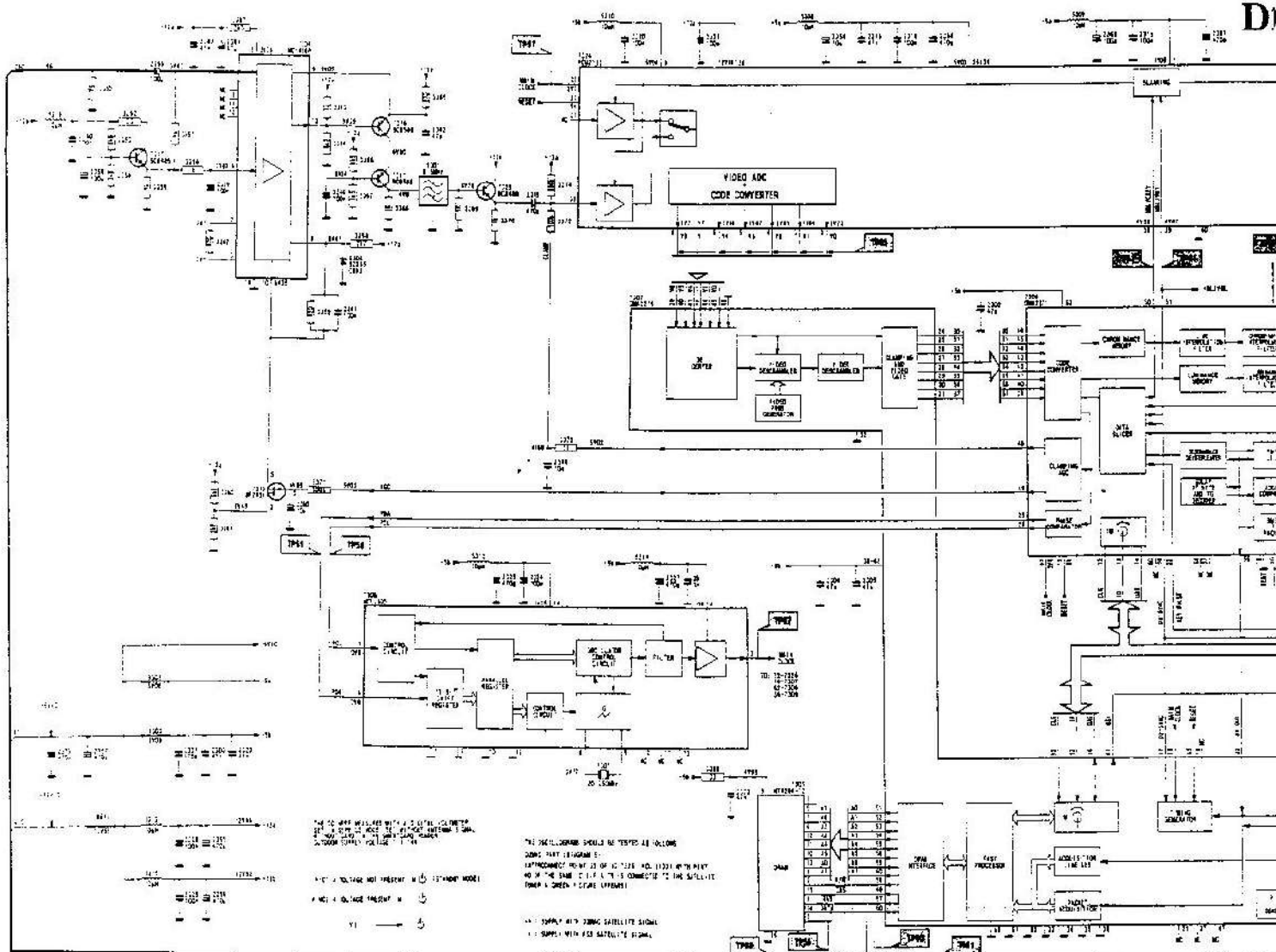
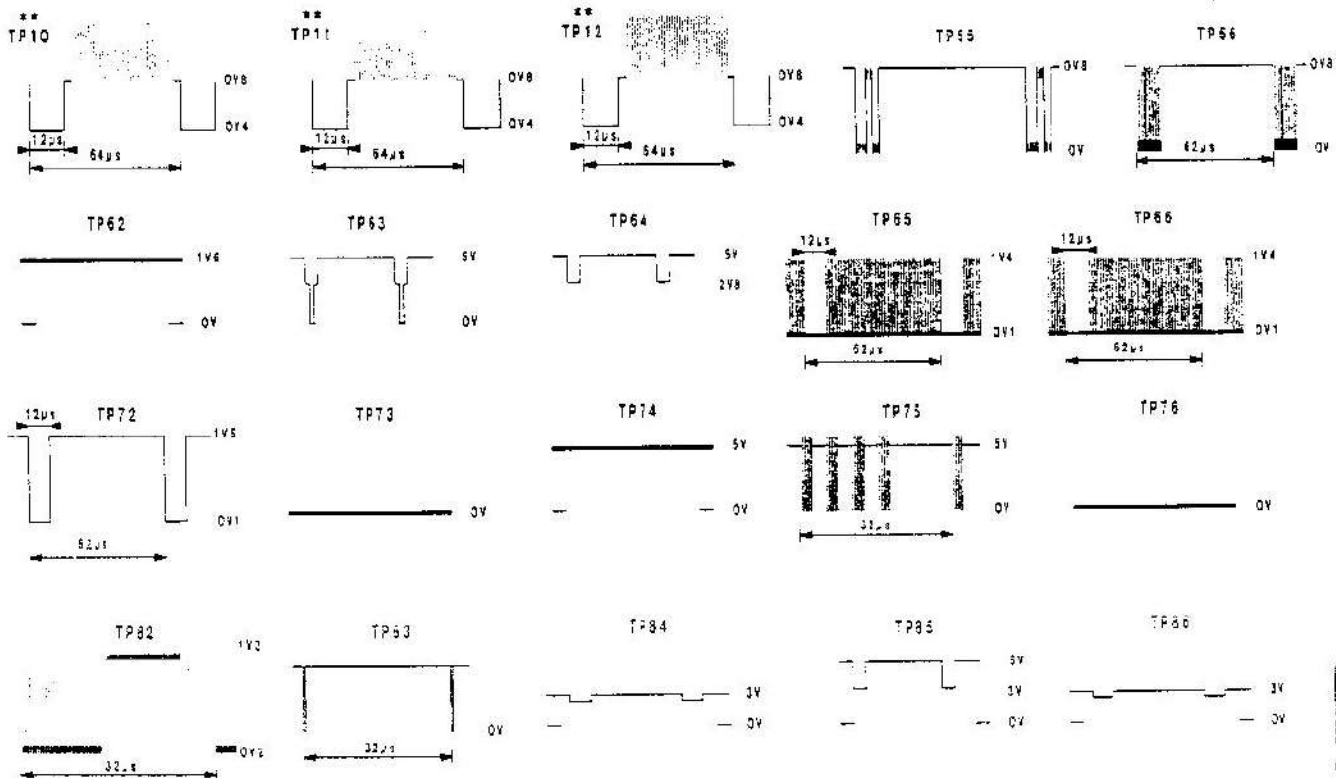
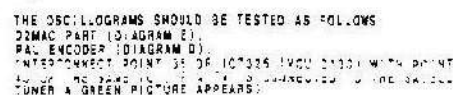




Waveforms

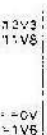


1. $\frac{1}{2}$



$\varphi = 0^\circ$
 $\varphi = 0^\circ$
 $\varphi = 2V5$
 $\varphi = 2V5$

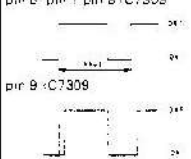
$\varphi = 0^\circ$
 $\varphi = 0^\circ$
 $\varphi = 2V5$
 $\varphi = 2V5$



gram



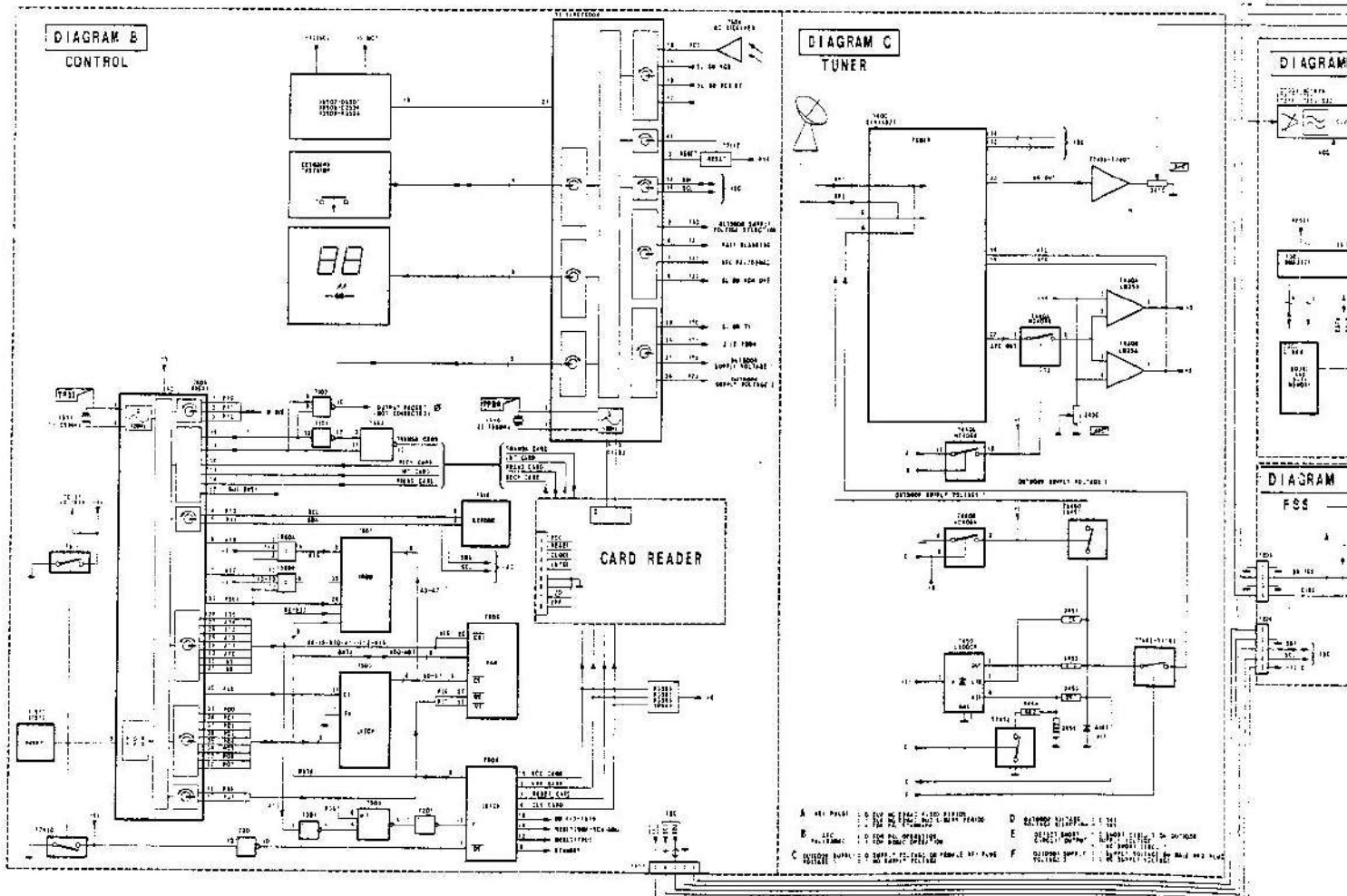
Service Mode Cont...

Code Number	Command	Answer
13 0	READ CARD PRESENCE	PIN 14 IC7505 (diagram B) C = 0V without card 4V8 with card
14 0	To activate internal pattern	
14 0	INT PATTERN ON	See electrical adjustments
14 1	INT PATTERN OFF	
15 0	PLL adjustment	See electrical adjustments
16 0	AFC adjustment	See electrical adjustments
17 0	RGB and CUT OFF adjustment	See electrical adjustments
18 0	To check TPU (IC7309) (diagram E)	
18 1	To activate TPU internal pattern	
18 1	TPU PATTERN ON	pin 6, pin 7, pin 8 IC7309 
18 0	TPU PATTERN OFF	
19 0	To check tuning voltage, pin 11 Tuner (1400) (diagram C)	
19 0	TUNE ON CHANNEL XX	Connect an oscilloscope on pin 11 of the TUNER. The tuning voltage increases or decreases according to the channel. xx = Number of channel = 01 to 40
20 0	To check the satellite signal	
20 0	READ BER - XY	Select a D2MAC programme Select the service mode Compose Code number 20 0 xy = B: error rate = 00 if the signal is correct.

Code Number	Command	Answer
21 0	Service mode exit	
23 0	STEREO (6615) ACCESS:6503) D2MAC:6517)	
23 0	STAND BY: 165 0, LEDS COMMAND	
23 0	LEDS = XXXX	
23 0	XXXX = 1111 LEDS	
23 0	XXXX = 0000 LEDS	
25 0	READ Detect Short Circuit	pin 12 IC7519 (diagram B)
25 0	READ DETECT - C/C = 1	+4V if no short circuit
25 0	READ DETECT - C/C = 0	1V if short circuit
26 0	PAL adjustment and checking PAL part	
26 0	DSY = 0	RGB and synchro respectively on pins 3, 4, 5 and 2 of IC7101 (diagram D)
26 1	The screen disappears	RGB and synchro not present
28 0	Writing VCR slow blanking	Allows you to check 77007, 77006, 77017, 77018, 06020 and associated components (diagram C)
28 0	VCR St=0	pin 8 1001 = 0V pin 8 IC7519 = 5V pin 15 IC7519 = 5V pin 6 IC7519 = 0V
28 1	VCR St=-12	pin 8 1001 = 11V6 pin 8 IC7519 = 0V pin 15 IC7519 = 0V pin 6 IC7519 = 5V
28 2	VCR St=-6	pin 8 1001 = 6V1 pin 8 IC7519 = 0V pin 15 IC7519 = 5V pin 6 IC7519 = 5V
29 0	To check outdoor supply voltage 1 (Female RF Connector)	Allows you to check IC7519 (diagram B) IC7440, IC7450, T7452, T7451, T7450 and associated components (diagram C)
29 0	LNC 1 = LNC 2 = 0	OSV1=0V OSV2=0V pin 26 IC7519 = 0V pin 27 IC7519 = 5V

Code Number	Command	Answer
29 1	LNC 1 = -14	OSV1=14V pin 26 IC7519 = 0V pin 27 IC7519 = 0V pin 27 IC7519 = 0V
29 2	LNC 1 = -16	OSV1=18V pin 26 IC7519 = 0V pin 27 IC7519 = 0V pin 27 IC7519 = 0V
30 0	To check outdoor supply voltage 2 (male RF Connector)	
30 1	LNC 2 = -14	OSV2=14V pin 26 IC7519 = 5V pin 27 IC7519 = 5V pin 9 IC7519 = 0V
30 2	LNC 2 = -18	OSV2=18V pin 26 IC7519 = 5V pin 27 IC7519 = 5V pin 9 IC7519 = 5V
31 0	RF input Selection	
31 1	Select RF 1	
31 2	Select RF 2	
32 0	TV Fast Blanking	pin 13 IC7400 (diagram C) = 0V pin 16 1002 = 0V pin 13 IC7004 = 2V5 pin 16 1002 = 2V5
32 1	TV Fast Blanking	
33 0	FSS subcarrier	Allows you to check switching Voltage Mono/Stereo pins 10-11 IC7201 Mute voltage 15 IC7201 (diagram D) X = 0 Mono, X = 1 stereo Y = 0 sound L, Y = 1 sound R MNO = stereo sound carrier frequencies (see technical specifications)
33 0	FSS SOUND L=7.02 R=7.26 M (M=Mono X=0, Y=0, MNO=702)	pin 10 and 11 IC7201 = 12V3 pin 15 IC7201 = 11V6
33 1	FSS SOUND R=7.02 L=6.84 S (S=Stereo X=1, Y=1, MNO=702)	pin 10 and 11 IC7201 = 0V pin 15 IC7201 = 11V6

Block Diagram



Electrical Adjustments

POWER SUPPLY ADJUSTMENT :

Connect a DC voltmeter between ground (pin 1 of TRANSFORMER 5602) and PT2 (strap 9606).

Adjust the measured voltage to 5.130V $\pm$ 30mV by means of resistor 3624.

AFC ADJUSTMENT :

Before proceeding to this adjustment, it is better to adjust the power supply as described before, if not already done.

This adjustment must be done using SERVICE COMMAND 16 02, designed for an adjustment when the set is WARM, and WITHOUT COVER, what is achieved after 10 minutes under power.

Select a PAL signal you receive correctly.

Make sure you have no problem with the signal quality (Polarisation, Disposition, Weak signal....)

Enter SERVICE MODE as described in section 8.1.

Enter the SERVICE COMMAND 16 02 (TUNE - 2 STEPS) to start the AFC adjustment.

The AFC adjustment is then obtained when adjusting resistor 3440 to have both 'STEREO' and 'ACCESS' leds ON on this live signal. Press 'MENU' to end this command.

Control then that SERVICE COMMAND 16 05 (Tune - 5 STEPS) turns the 'STEREO' led OFF and SERVICE COMMAND 16 11 (Tune + 1 STEP) turns the 'ACCESS' led OFF. You must press 'MENU' to end both these commands.

THIS ADJUSTMENT IS DEPENDING ON YOUR LNC'S DRIFT, and in some difficult cases will have to be done on the customer's installation (in case his LNC has a very important drift).

A better adjustment can be obtained by connecting to the input a D2MAC pre-emphasized signal at 977.48 MHz, when the set is tuned on DBS SATELLITE CHANNEL 1 (whose frequency is precisely 977.48 MHz).

Exit SERVICE MODE by pressing 'STAND BY'.

BASE-BAND SIGNAL LEVEL ADJUSTMENT :

Select a PAL signal you receive correctly.

Connect an oscilloscope between Ground (modulator 7102's chassis) and pin 1 of modulator 7102 (the nearest pin to TV SCART).

Adjust the video peak-peak level to 0.94V $\pm$ 40 mV by means of resistor 3410.

PAL COLOR CARRIER FREQUENCY ADJUSTMENT :

Enter SERVICE MODE as described in section 8.1.

Connect a frequency counter between ground (modulator 7102's chassis) and Pin 4 of S-VHS PLUG 1101 (or on resistor 3111).

Enter the SERVICE COMMAND 26 1 (Bit DSY = 0), to cut the synchro and luminance signals.

This way, you have on the test-point only the color carrier frequency, and you don't influence its value with your probe.

Adjust the frequency to 4.433619 MHz $\pm$ 50 Hz by means of capacitor 2136.

FSS BOARD ADJUSTMENTS :

This adjustment is made to obtain a similar audio level on both D2MAC and PAL channels, and between RIGHT and LEFT PAL audio channels, when changing from one of these transmission standards to the other.

It can be made with an oscilloscope connected to either one SCART CONNECTOR (LEFT : pin 3, RIGHT : pin 1, Ground : pin 21) or the GINCH LEFT/RIGHT outputs, but as the audio levels are depending on the content of the received signal, the best way to do this adjustment is 'by ear'.

Switching continuously from a D2MAC CHANNEL TO A PAL channel, adjust resistor 3275 to balance the left MAC audio level with the left FSS audio level.

Then, on a PAL channel, adjust 3276 to balance the right and left FSS audio levels (this must be done with a STEREO PAL sound).

PLL ADJUSTMENT :

Select a D2MAC signal you receive correctly.

Enter SERVICE MODE as described in section 8.1.

Select service command 15 0 (PLL ADJUST.).

The present value is now indicated on the right side of the second SERVICE MODE line.

Adjust it via the remote control, by use of the RED '-' and BLUE '+' buttons, to the value corresponding to the smallest horizontal shift of the picture (the sound must also be quite good), and memorise it by 'MENU' (a 'DONE' message appears).

Exit SERVICE MODE by pressing 'STAND BY'.

RGB LEVELS ADJUSTMENT :

During this adjustment, you will adjust RED/GREEN/BLUE levels and RED/GREEN/BLUE CUT-OFF levels for the three RED/GREEN/BLUE signals, and these levels will correspond to the followings :



WARNING : this adjustment must be processed in a SINGLE TIME, because some values are switched to default values at the beginning.

Enter SERVICE MODE as described in section 8.1.

Select SERVICE COMMAND 14 0 (INT PATTERN ON). You now can see a picture with a 100% black bar on the LEFT, and then a 50% grey on the rest of screen.

Select SERVICE COMMAND 17 0 : ADJUST WHITE - RED

At this moment, all the CUT-OFF values have been set to the MAXIMUM value (FF), so the picture brightness has changed a little.

The present value for the RED LEVEL is now indicated on the right end of the second SERVICE MODE line.

Measure this signal with an oscilloscope connected between Ground (modulator's chassis) and pin 3 of IC 7101 (TP 48).

Adjust it via the remote control, by use of the RED '-' and BLUE '+' buttons, to the value corresponding to a RED LEVEL of 480 mV $\pm$ 10mV.

Enter 'MENU' to go to the next step : ADJUST WHITE - GREEN

The present value of the GREEN LEVEL is now indicated.

Measure this signal between Ground and pin 4 of IC 7101 (TP 47).

Adjust it to a GREEN LEVEL of 400 mV $\pm$ 10mV.

Enter 'MENU' to go to the next step :

Error Messages

Error Message	CAUSE	Possible defective component
E0	DATA Contained in line 625 acquisition problem	IC 7307 : DMA2275 or IMBus blocked (Diagram E)
E1	error on TPU2735	IC 7309 : TPU2735 or IMBus blocked (Diagram E)
E2	error on IMBus detected by DMA2275	IC 7305 : AMU248 IC 7306 : DMA2271 IC 7307 : DMA2275 IC 7309 : TPU2735 or IMBus blocked (Diagram E)
E3	NO acknowledge from TUNER	MODULE 1400 : TUNER or I2CBus blocked (Diagram C)
E4	No acknowledge from TDA8440 position 7003	IC 7003 : TDA8440 or I2CBus blocked (Diagram C)
E5	No acknowledge from TDA8440 position 7002	IC 7002 : TDA8440 or I2CBus blocked (Diagram C)
E6	No acknowledge from TSA6057	IC 7219 : TSA6057 or I2CBus blocked (Diagram D)
E7	No acknowledge from EEPROM	IC 7218 : X2404P or I2CBus blocked (Diagram B)
E8	DATA contained in SERVICE IDENTIFICATION CHANNEL (VOIE) acquisition problem	IC 7307 : DMA2275 or signal quality (Diagram E)
E9	Reset problem on DMA2271/DMA2275 or clock problem	IC 7306 : DMA2271 IC 7307 : DMA2275 IC 7308 : MCU2600 (Diagram E)
EA	Bad read/write result in Pseudo Random Binary Sequence (PRES) registers of DMA2275	IC 7307 : DMA 2275 (Diagram E)
CC	Antenna supply failure	Short-circuit on the input used at this time

- In case of error E0, E2, E8 and E9, a RESET is made on DMA2271, DMA2275 and AMU248.
- In case of error E1, a RESET is made on TPU2735, and STU904 is switched to 'MENU OFF' mode.
- When IMBus or I2CBus is mentioned in the above list, first check the activity on the concerned bus.
- In any case, always check the CLOCK signals before changing any IC.

LEXICON

DMA = 'D2MAC processor'
TPU = 'Teletext Processing Unit'

AMU = 'Audio Mixing Unit'
MCU = 'Main Clock Unit'
VCU = 'Video Converter Unit'

ADJUST WHITE : BLUE

The present value of the BLUE LEVEL is now indicated.

Measure this signal between Ground and pin 5 of IC 7101 (TP 49).

Adjust it to a BLUE LEVEL of 480 mV $\pm$ 10mV.

Enter 'MENU' to go to the next step :

ADJUST CUT : GREEN

The present value of the GREEN CUT LEVEL is now indicated.

Measure this signal between Ground and pin 4 of IC 7101 (TP 49).

Adjust it to a GREEN CUT LEVEL of 60 mV $\pm$ 5mV.

Enter 'MENU' to go to the next step :

ADJUST CUT : RED

The present value of the RED CUT LEVEL is now indicated.

Measure this signal between Ground and pin 3 of IC 7101 (TP 48).

Adjust it to a RED CUT LEVEL of 60 mV $\pm$ 5mV.

Enter 'MENU' to go to the next step :

ADJUST CUT : BLUE

The present value of the BLUE CUT LEVEL is now indicated.

Measure this signal between Ground and pin 5 of IC 7101 (TP 49).

Adjust it to a BLUE CUT LEVEL of 60 mV $\pm$ 5mV.

Memorise this value by pressing 'MENU' (a 'DONE' message appears).

Select SERVICE COMMAND 14 1 (INT PATTERN OFF) to remove the internal pattern.

Exit SERVICE MODE by pressing 'STAND BY'.

Service Mode

The Service Mode allows to : Command some electronic switches in the set.

Read some inputs

Make some adjustments

Check the correct connection between ICs via I2C bus

Check the functioning of some ICs

By using the remote control handset.

To use the service mode, make the connections as shown in the drawing (Fig.1)

Service equipment needed.

A : Oscilloscope

A DC voltmeter

Using the service mode.

Starting of the service mode.

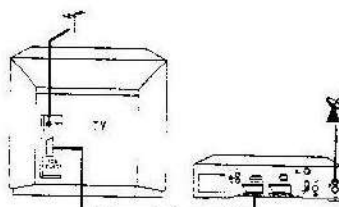
Switch your TV ON

Switch your satellite receiver ON

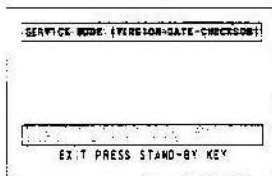
Press



buttons on the remote control.
You should now see the following screen.
In service mode the display shows "SE".



(Fig.1)



List of Service Mode commands

Important note : To avoid to lose data inside the memory, don't use other codes than those mentioned hereunder.

Code Number	Command	Answer
001	Autotest X	X = 0 : all tests are OK otherwise, X = number of the test IN "ALL"
	Without Card	0 : ROM 7501 1 : RAM 7508 2 : EEPROM 7518 3 : KEYBOARD 7519 4 : 38738Kz clock 5 : Pres. Card 6 : Ext Card 7 : Trans. and Receiv. Card
012	Reading VCR slow blanking	VCR Sb (pin 8 1001) diagram C 0 : VCR Sb = 0 = 0V 1 : VCR Sb = -12 = -12V3 2 : VCR Sb = -6 = 6V3
02	Writing TV slow blanking	TV Sb (pin 8 1002) = 2V
020	the screen disappears	
021	TV Sb = -12	= 12V3
022	TV Sb = -6	= 6V3
03	To check IC7004 (TEA 5116) diagram C	
030	the screen disappears	pin 3 IC 7004 = 0V Switching: pin 8 - pin 6 2 4 18 16 9 15 1 17
031	TEA 5116 - 1	pin 3 IC 7004 = 5V Switching: pin 12 - pin 6 20 4 14 16 13 15 19 17
04	To check IC7002 (TEA 8440) diagram C	
040	IC7002 switch : 1	Switching: pin 5 → pin 14 9 12 1 16
041	IC7002 switch : 4	pin 7 → pin 14 10 12 3 16

Code Number	Command	Answer
05	To check IC7003 (TEA 8440) diagram C	
050	IC7003 switch : 0	Switching: pin 5 → pin 14 9 12 3 16
055	the screen disappears	pin 7 → pin 14 10 12 1 16
07	AFC PAL/D2MAC	
070	AFC : PAL	pin 7 IC 7519 diagram B = 0V
071	AFC : D2MAC	= 5V
To check Card reader part		
08	To activate 3.579MHz clock	
080	CLK CARD ON	CLK CARD = 3.579MHz
081	CLK CARD OFF	CLK CARD = 0V
09	To activate VCC Card	
090	VCC CARD ON	VCC CARD = 5V
091	VCC CARD OFF	VCC CARD = 0V
10	RST CARD	
100	RST CARD = 0	RST CARD = 0V
101	RST CARD = 1	RST CARD = 5V
11	To activate VPP CARD	
110	VPP CARD = -15	VPP CARD = 15V
111	VPP CARD = -5	VPP CARD = 5V
120	READ CARD INT	0: INT CARD = 0V without card 1 = 4V9 with card

General Information

D2 MAC Eurocrypt PAL Satellite Receiver

Recommended Safety Parts

MAIN PANEL

ITEM	PART NO.	DESCRIPTION
1602	4822 265 20172	Mains Socket
2602	4822 121 70049	470pF
2605	5322 121 44271	330nF 10% 250V
3001	4822 053 12479	47 ohms 5% 3W
3527	4822 052 10478	40ohms 7.5% 0.33W
3620	4822 116 83552	1k 5 5%
3621,3622	4822 053 12124	120k 5% 3W
3623	4822 052 10228	2 ohms 2.5% 0.33W
5601	4822 156 21098	Mains Filter
5602	4822 146 31037	Transformer
5609,5610	5322 158 10052	Coil
7601	4822 130 10025	CNX82A

FSS BOARD

ITEM	PART NO.	DESCRIPTION
3119,3268,	4822 052 10109	10 ohms 5% 0.33W
3270,3283	4822 052 10109	10 ohms 5% 0.33W

Specifications

General :

Mains voltage : 220-240V $\pm$ 10% 50Hz
Power consumption : $\leq$ 40W
Switchable LNC supply voltage : 10V, 14V, 18V 350mA)
Remote controlled (RC 5914)
Possible interconnection with an external decoder
T.V. screen ratio indicated on SCART P1 and S-VHS socket.

D2MAC output :

R.G.B. signals : towards SCART P1 and PAL encoder

Audio

: R,L via CINCH connectors

PAL output :

Towards scarts P1, P2 and modulator
Chrominance and luminance signals towards S-VHS output.

Remodulation :

PAL G modulator
Output channel : adjustable from 40 to 49
Bypass : 47 - 860 MHz

The remodulated signal comes from the PAL encoder output or the FSS board output.

Selection, demodulation :

Input frequency : 950 - 1750 MHz
Input level : 47dBuV to 77dBuV, 750

D2MAC :

Frequency modulation : 13.5 MHz/V - 16 MHz/V
Channel bandwidth : 27 MHz

MAC de-emphasis

EUROCRYPT conditional access system via PC2 smart card

D2MAC tolerant

Keyed AFC window for D2MAC standards

PAL :

Frequency modulation : 16 MHz/V
Channel bandwidth : 27 MHz

PAL de-emphasis

AFC window for PAL standards

ASTRA compatible non linear sound companding

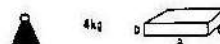
Audio frequency range : (5.5 to 8.5MHz)

Stereo sound carrier frequencies

A = 7.02 - B = 7.20 - C = 7.38 - D = 7.56 MHz

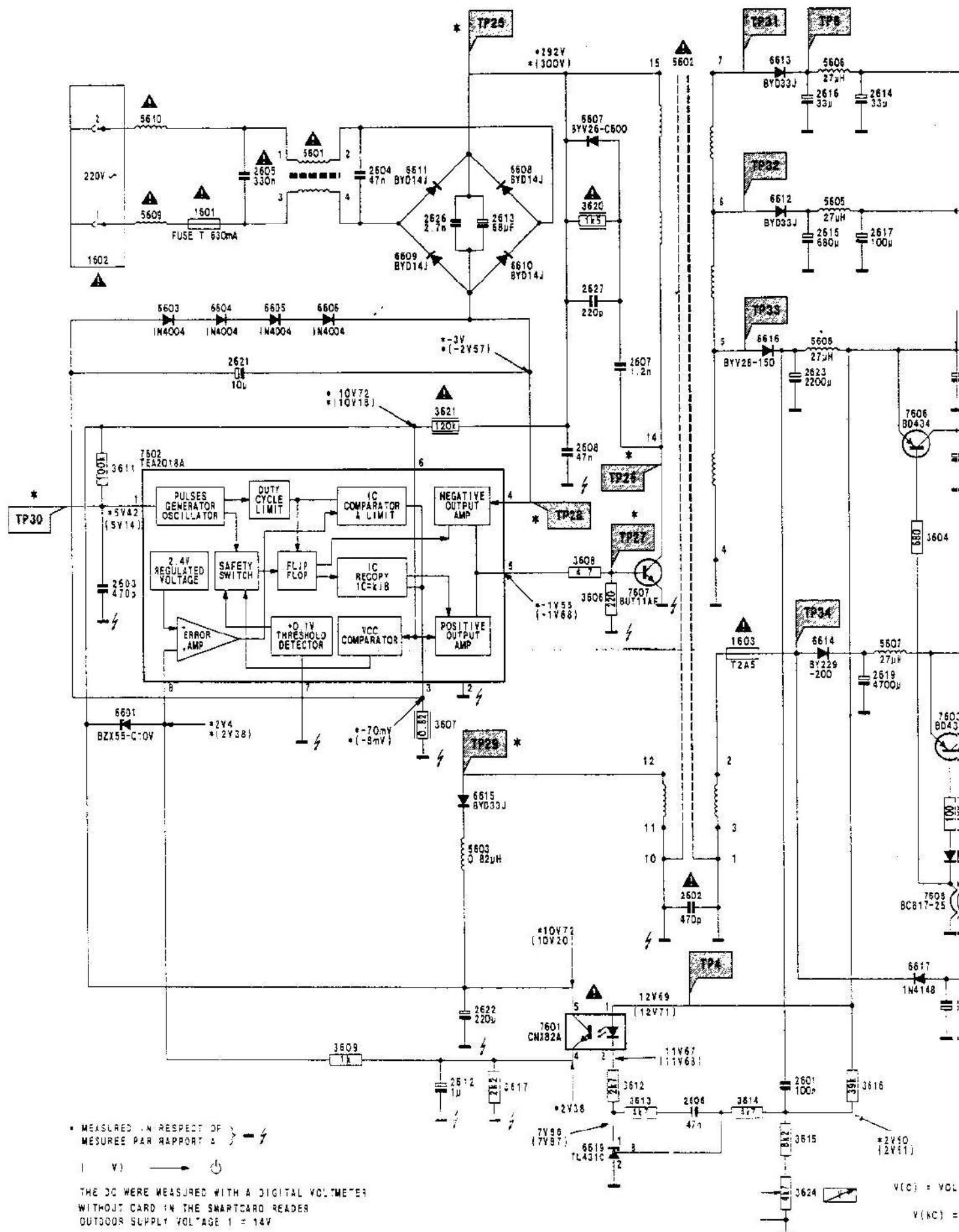
E = 7.74 - F = 7.92 - G = 8.10 - H = 8.28 MHz

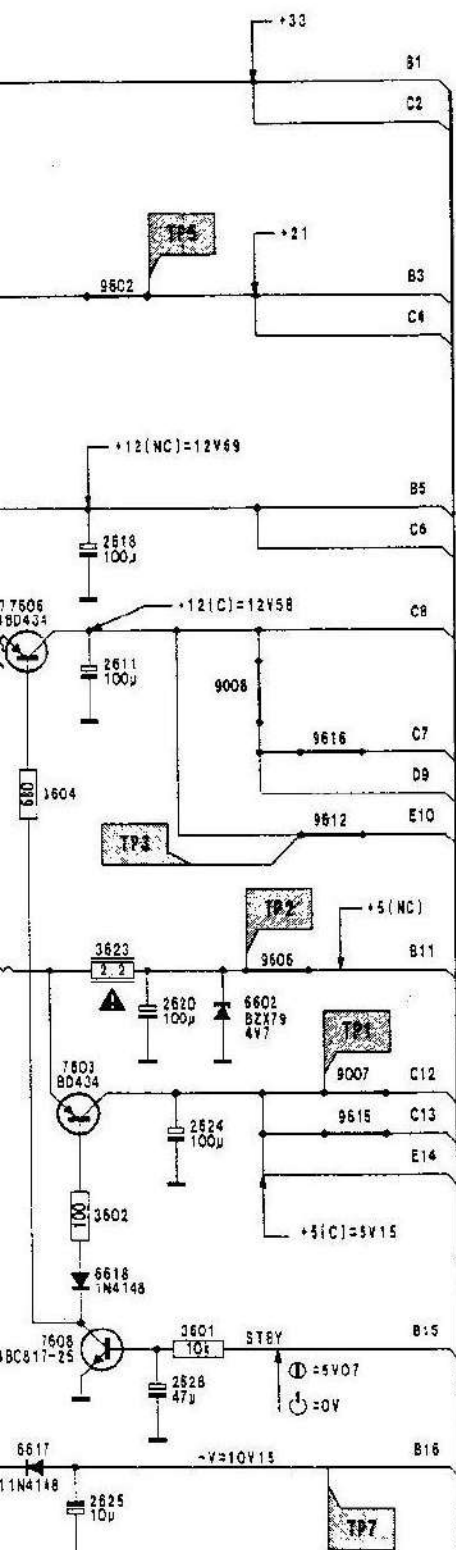
Pre-programming stored per preset with user-selectable combinations for stereo pairs : A/B - C/D - E/F - G/H.



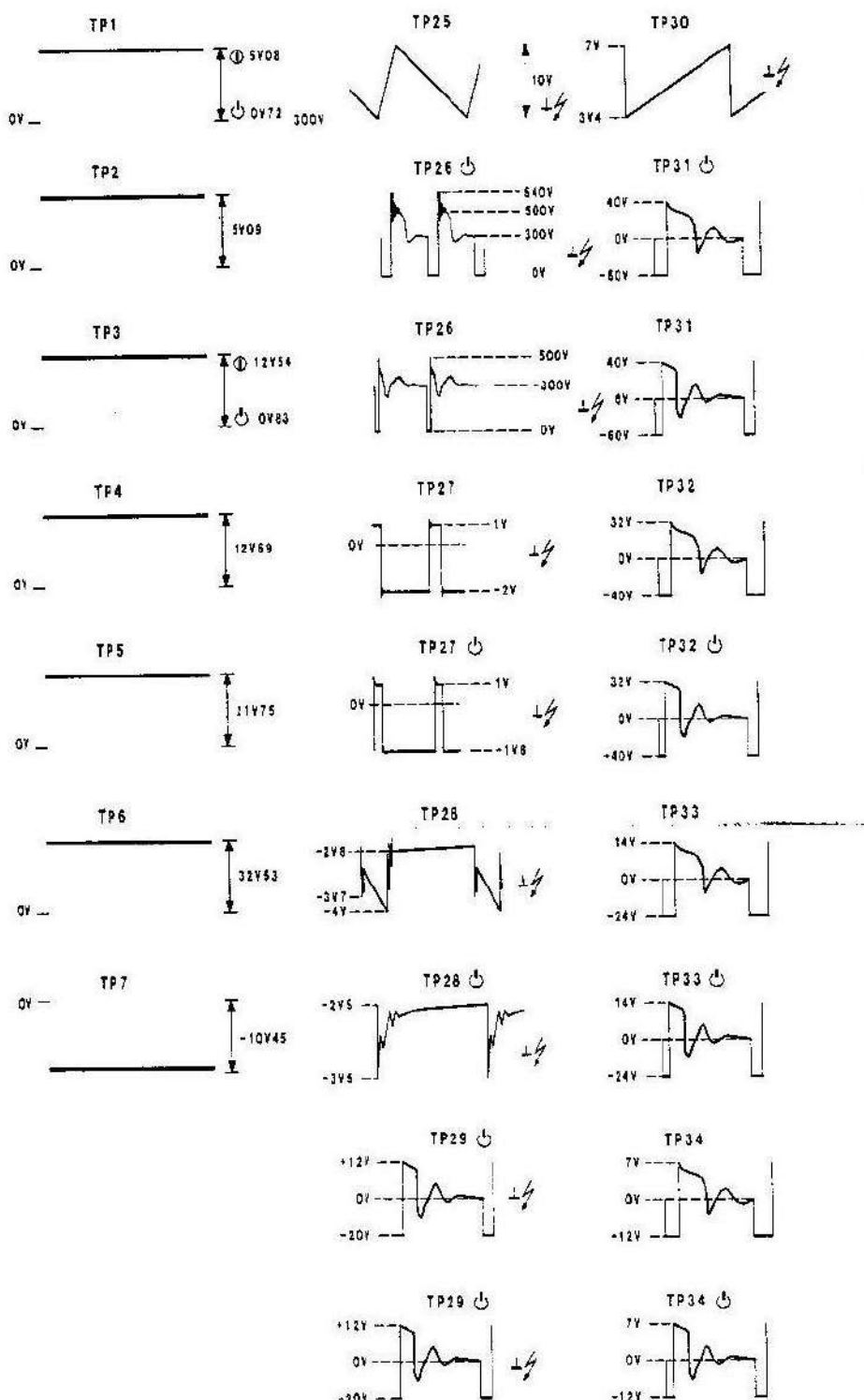
4kg
420x81x252mm

Power Supply Diagram



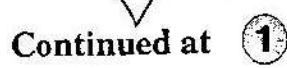


Power Supply Waveforms



(C) = VOLTAGE NOT PRESENT IN (STANDBY MODE)
 (NC) = VOLTAGE PRESENT IN (STANDBY MODE)

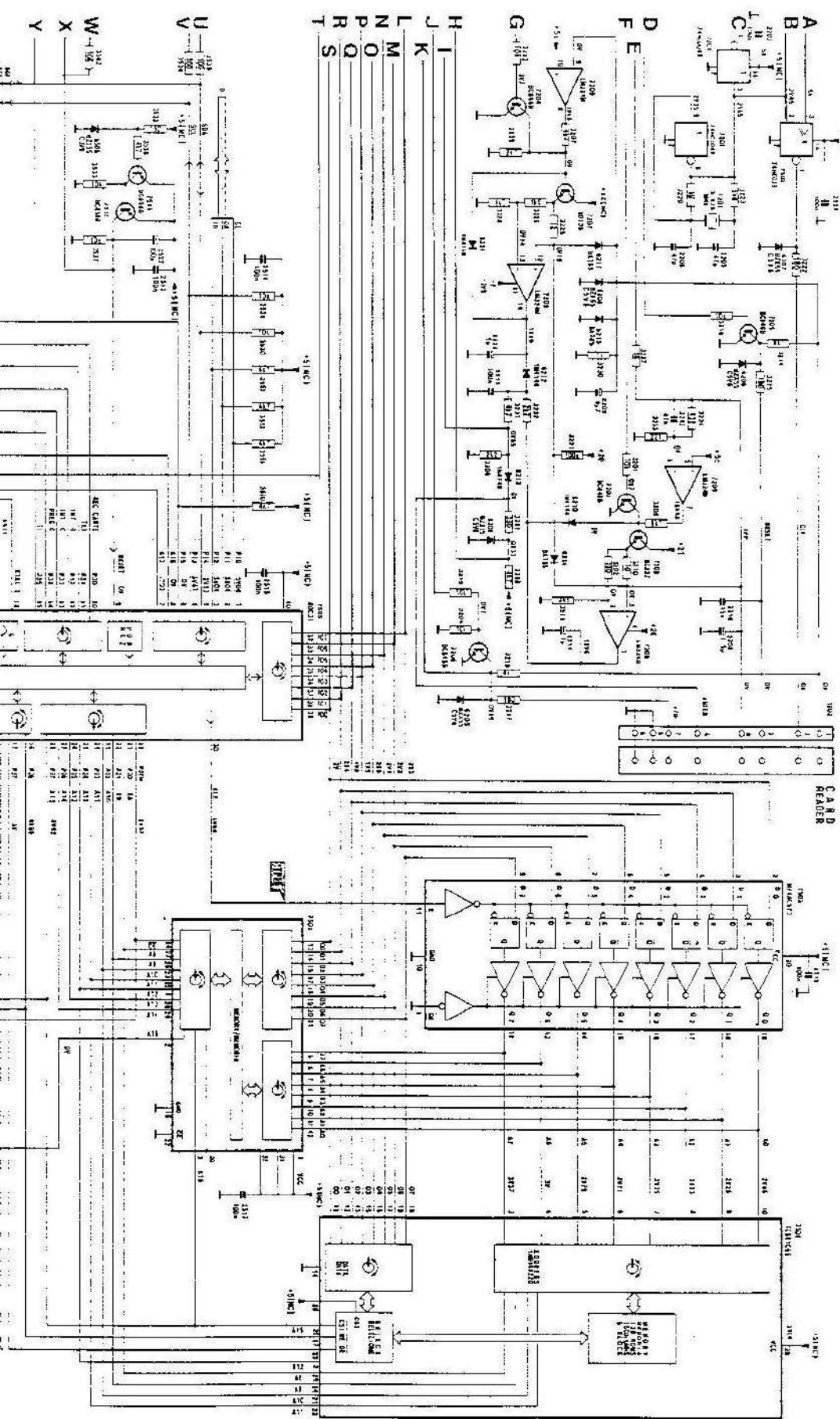
B-C
 D-E



1.06 DC VOLTAGE MEASURED WITH 1 DIGITAL VOLTAGE
SET IN SERVICE MODE "E" WITHOUT LOAD AND SIGNAL
WITHOUT LOAD IS THE SAME AND ALTHOUGH
OUTDOOR SUPPLY TO FAN IS 1.0V

Diagram

1



Waveforms

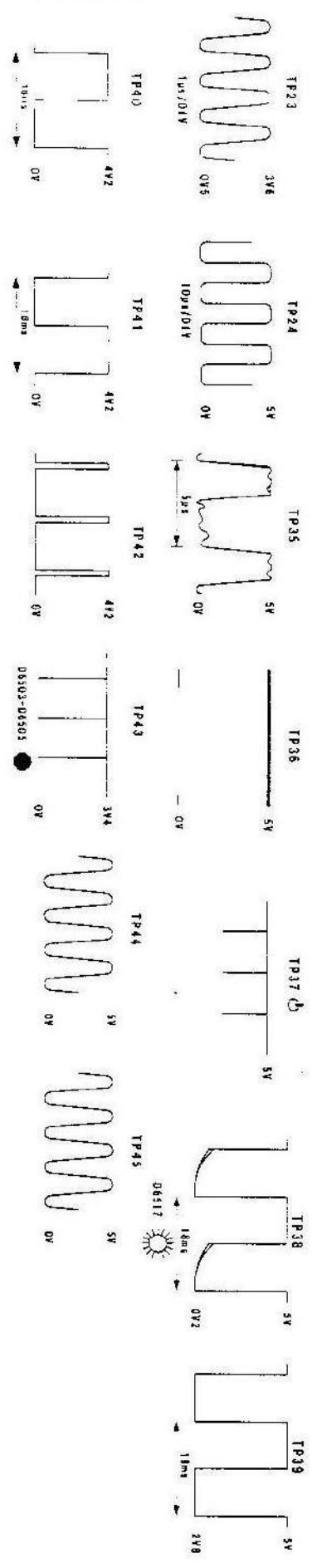
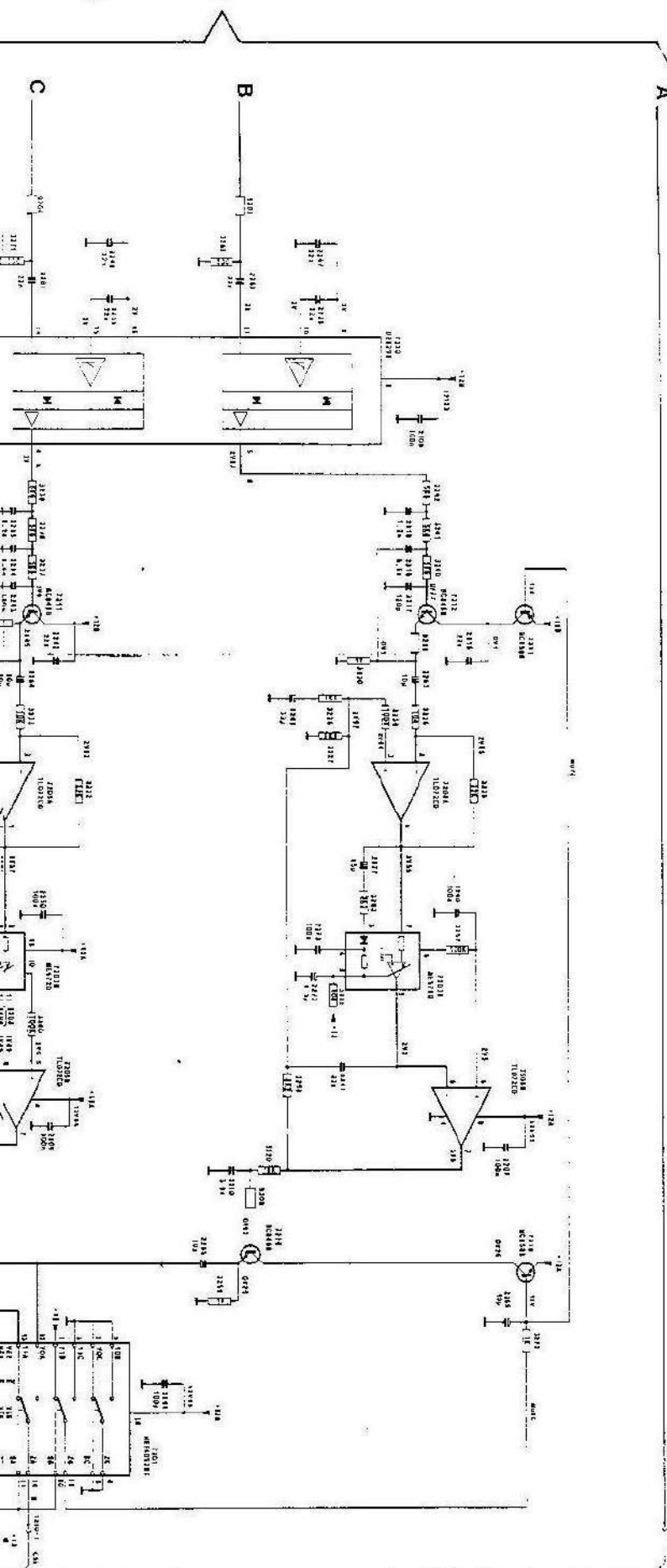
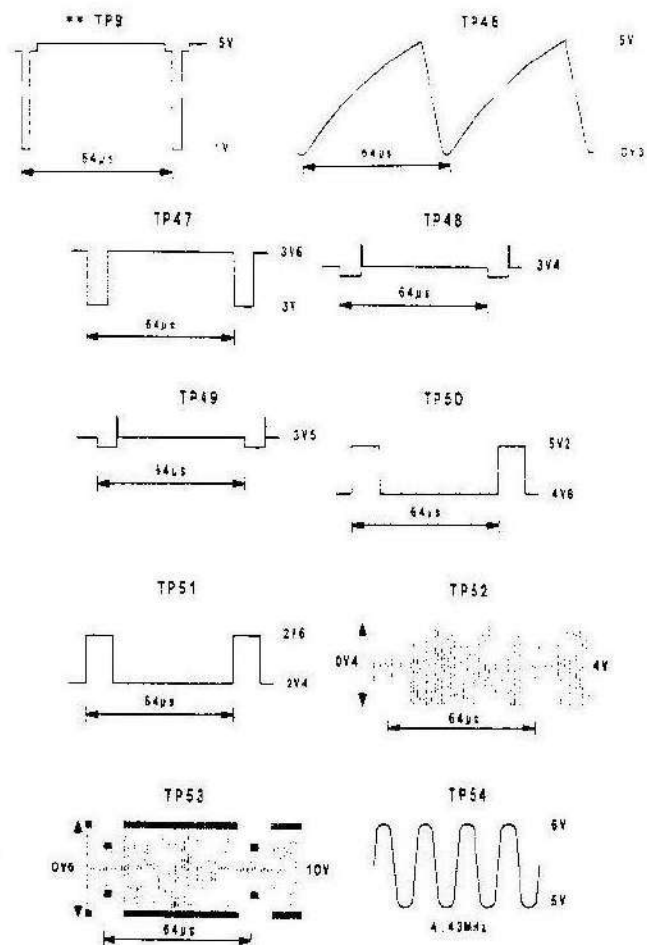


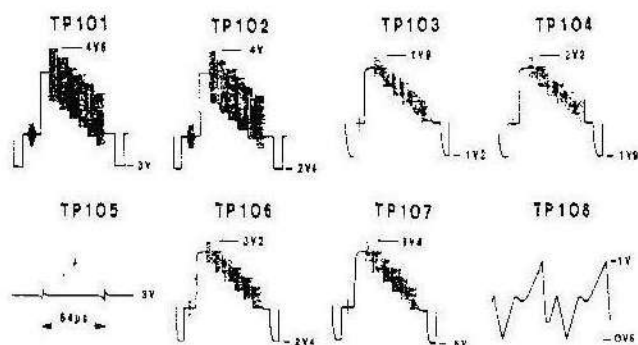
Diagram 3



PAL Waveforms

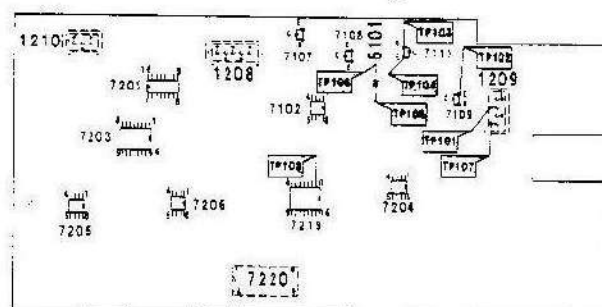


FSS Panel Waveforms

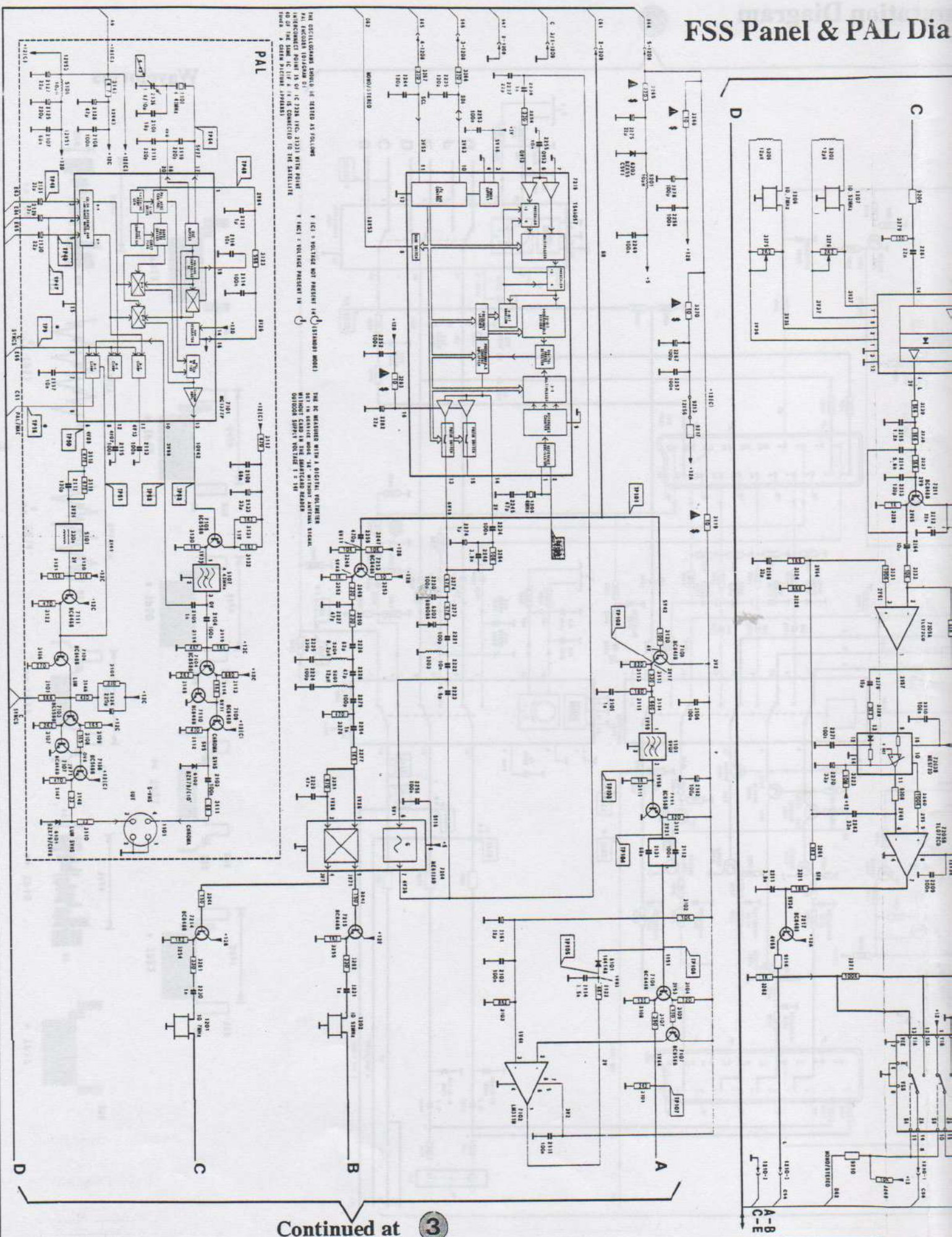


THE OSCILLOGRAMS SHOULD BE TESTED AS FOLLOWS:
 03MAC PART (DIAGRAM E),
 PAL ENCODER (DIAGRAM D),
 INTERCONNECT POINT 35 OF IC1326 (VCU 2133) WITH POINT
 40 OF THE SAME IC. IF A TV IS CONNECTED TO THE SATELLITE
 TUNER A GREEN PICTURE APPEARS.

FSS Panel Layout



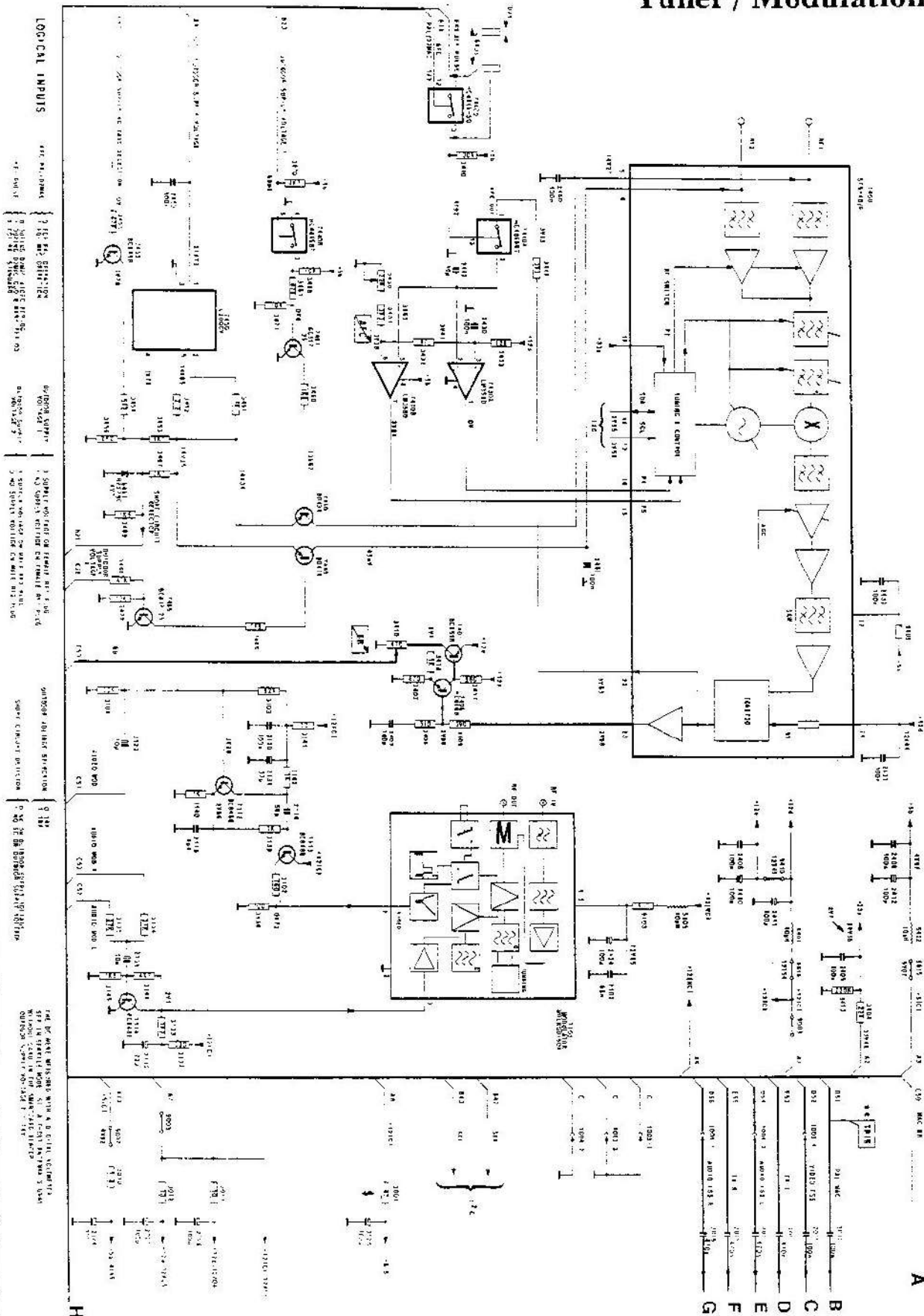
FSS Panel & PAL Dia



Continued at

3

Tuner / Modulation / Commutator



mutation Diagram

2

Waveforms

