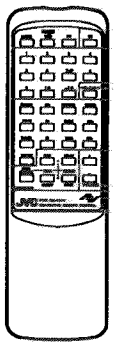
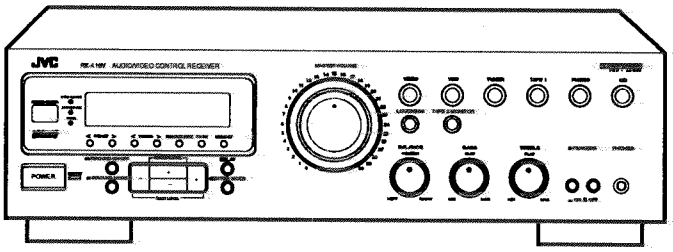
JVC

SERVICE MANUAL

AUDIO/VIDEO CONTROL RECEIVER

RX-416VBK





Area Suffix

A	Australia
BS	the U.K.
EF	Continental Europe
EN	Scandinavia
G	Germany
GI	Italy
UT	Taiwan
U	Other Area

COMPU LINK
Remote
Control Component

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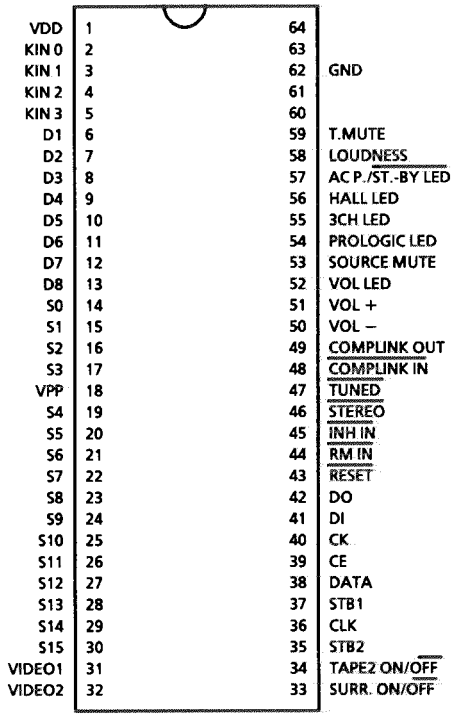
No. 20527
May. 1995

Description of ICs

■ MN171202J5Y1 (IC401) : SYSTEM CONTROLLER

1. Terminal Layout



2.Key Matrix

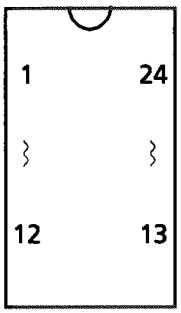
	KEY IN 0 (PIN2)	KEY IN 1 (PIN3)	KEY IN 2 (PIN4)	KEY IN 3 (PIN5)
KEY OUT 0 (PIN6)	PHONO (S401)	CD (S402)	TUNER (S403)	TAPE 1 (S404)
KEY OUT 1 (PIN7)	TAPE 2 MONITOR (S405)	VCR (S406)	VIDEO (S407)	LOUDNESS (S408)
KEY OUT 2 (PIN8)	BAND FM/AM (S409)	FM MODE MUTE (S410)	FREC. DOWN (S411)	FREC. UP (S412)
KEY OUT 3 (PIN9)	POWER (S413)	MEMORY (S414)	PRESET DOWN (S415)	PRESET UP (S416)
KEY OUT 4 (PIN10)	SURROUND (S417)	SURROUND MODE (S418)	REAR – (S419)	REAR + (S420)
KEY OUT 5 (PIN11)	DELAY (S421)	CENTER MODE (S422)	CENTER – (S423)	CENTER + (S424)

3. Description

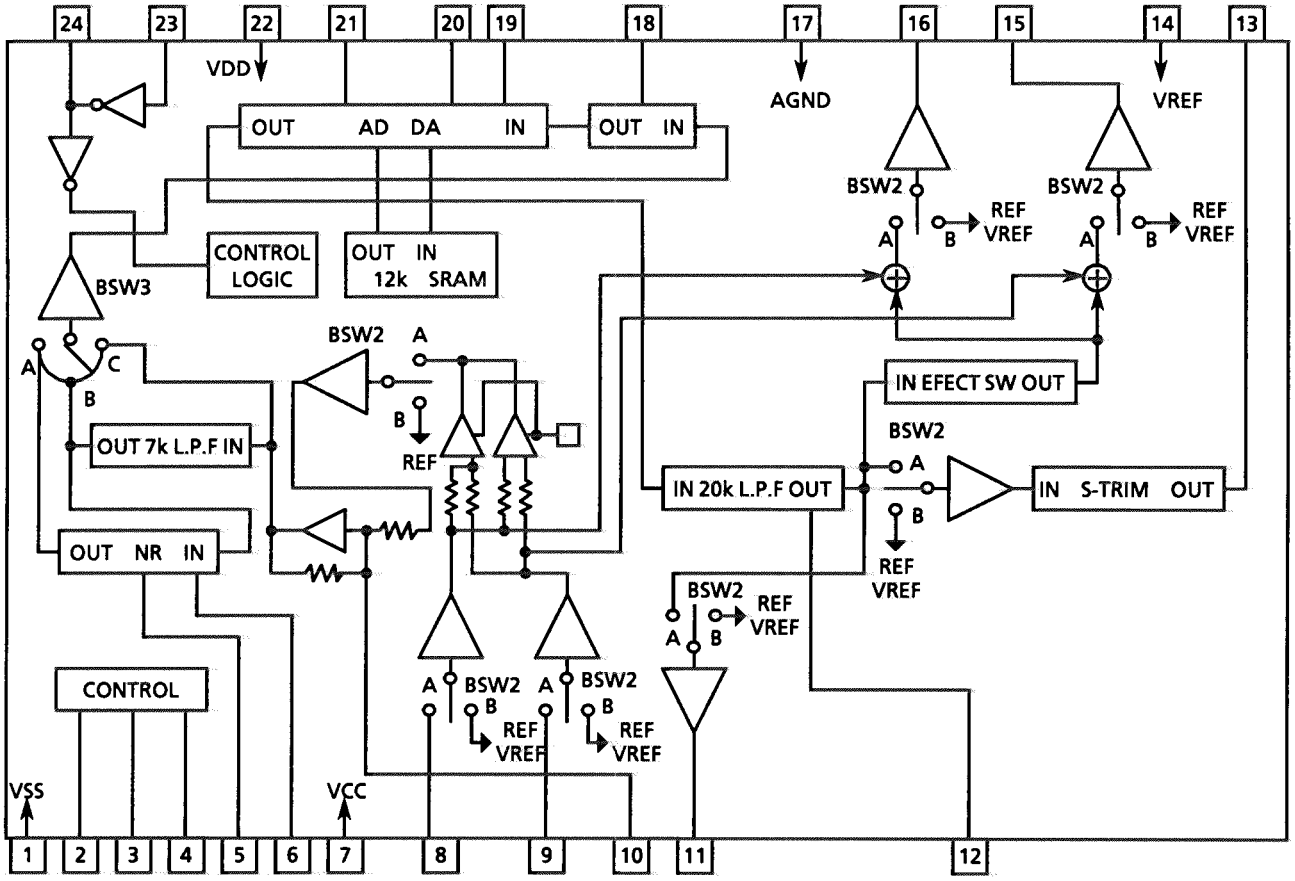
Pin No.	Symbol	I/O	Description	Pin NO.	Symbol	I/O	Description
1	VDD	--	Power supply	33	SURR. ON/OFF	O	Surround ON/OFF control
2	KIN 0	I	Key matrix input	34	TAPE2 ON/OFF	O	TAPE2 ON/OFF control
3	KIN 1	I	Key matrix input	35	STB2	O	Strobe signal for IC601 and IC641
4	KIN 2	I	Key matrix input	36	CLK	O	Clock output for IC601,641 and IC321
5	KIN 3	I	Key matrix input	37	STB1	O	Strobe signal for IC321
6	D1/KO0	O	Grid control signal (Key matrix output)	38	DATA	O	Data for IC601,641 and IC321
7	D2/KO1	O	Grid control signal (Key matrix output)	39	CE	O	Chip select signal for IC121
8	D3/KO2	O	Grid control signal (Key matrix output)	40	CK	O	Clock output (To IC121)
9	D4/KO3	O	Grid control signal (Key matrix output)	41	DI	I	Data from PLL synthesizer (From IC121)
10	D5/KO4	O	Grid control signal (Key matrix output)	42	DO	O	PLL synthesizer control data (To IC121)
11	D6/KO5	O	Grid control signal (Key matrix output)	43	RESET	I	Reset signal input
12	D7	O	Grid control signal	44	RM IN	I	Remote control signal input
13	D8	O	Grid control signal	45	INH IN	I	Inhibit signal input
14	S0	O	Segment control signal	46	STEREO	O	STEREO indication control
15	S1	O	Segment control signal	47	TUNED	O	TUNED indication control
16	S2	O	Segment control signal	48	COMPLINK IN	I	Compulink signal input
17	S3	O	Segment control signal	49	COMPLINK OUT	O	Compulink signal output
18	VPP	--	Power supply for FL display	50	VOL –	O	Volume control signal
19	S4	O	Segment control signal	51	VOL +	O	Volume control signal
20	S5	O	Segment control signal	52	VOL LED	O	Volume indication control
21	S6	O	Segment control signal	53	SOURCE MUTE	O	Source muting
22	S7	O	Segment control signal	54	PROLOGIC LED	O	PROLOGIC indication control
23	S8	O	Segment control signal	55	3CH LED	O	3CH indication control
24	S9	O	Segment control signal	56	HALL LED	O	HALL indication control
25	S10	O	Segment control signal	57	AC P./ST.-BY LED	O	STAND-BY indication control
26	S11	O	Segment control signal	58	LOUDNESS	O	Loudness ON/OFF control
27	S12	O	Segment control signal	59	T.MUTE	O	Tuner muting control signal
28	S13	O	Segment control signal	60	—	--	Connected to GND
29	S14	O	Segment control signal	61	—	--	Non connection
30	S15	O	Segment control signal	62	GND	--	GND
31	VIDEO1	O	Video control signal (To IC661)	63	OSC1	--	Oscillation terminal
32	VIDEO2	O	Video control signal (To IC661)	64	OSC2	--	Oscillation terminal

■ LV1011 (IC641) : Dolby Surround Passive Decoder

1. Terminal Layout



2. Block Diagram

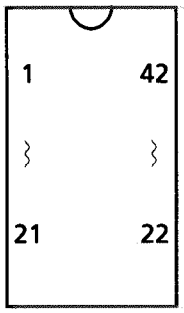


3. Pin Functions

Pin No.	Symbol	I/O	Functions
1	DGND	--	Digital GND
2	CLK	I	Serial interface clock
3	DATA	I	Serial interface data input
4	STB	I	Strobe signal input
5	NR-DET	--	Capacitor for noise reduction detection
6	NR-IREF	--	Resistor for noise reduction reference current
7	VCC	--	Supply
8	L-IN	I	Left channel signal input
9	R-IN	I	Right channel signal input
10	S-IN	I	Surround signal input
11	DELAY-OUT	--	Not used
12	DC-CUT	--	Capacitor for DC-cut
13	S-OUT	O	Surround signal output
14	VREF	--	Analog reference voltage
15	R-MIX-OUT	--	Not used
16	L-MIX-OUT	--	Not used
17	ADND	--	Analog ground
18	DC-CUT	--	Capacitor for DC-cut
19	D/A	--	Capacitor for integrator
20	NOISE SHAPER	--	Capacitor for noise shaper
21	A/D	--	Capacitor for integrator
22	VDD	--	Supply for the digital section
23	OSC	--	Oscillation terminal
24	OSC	--	Oscillation terminal

■ LA2785 (IC601) : Dolby Pro Logic Surround Signal Processor

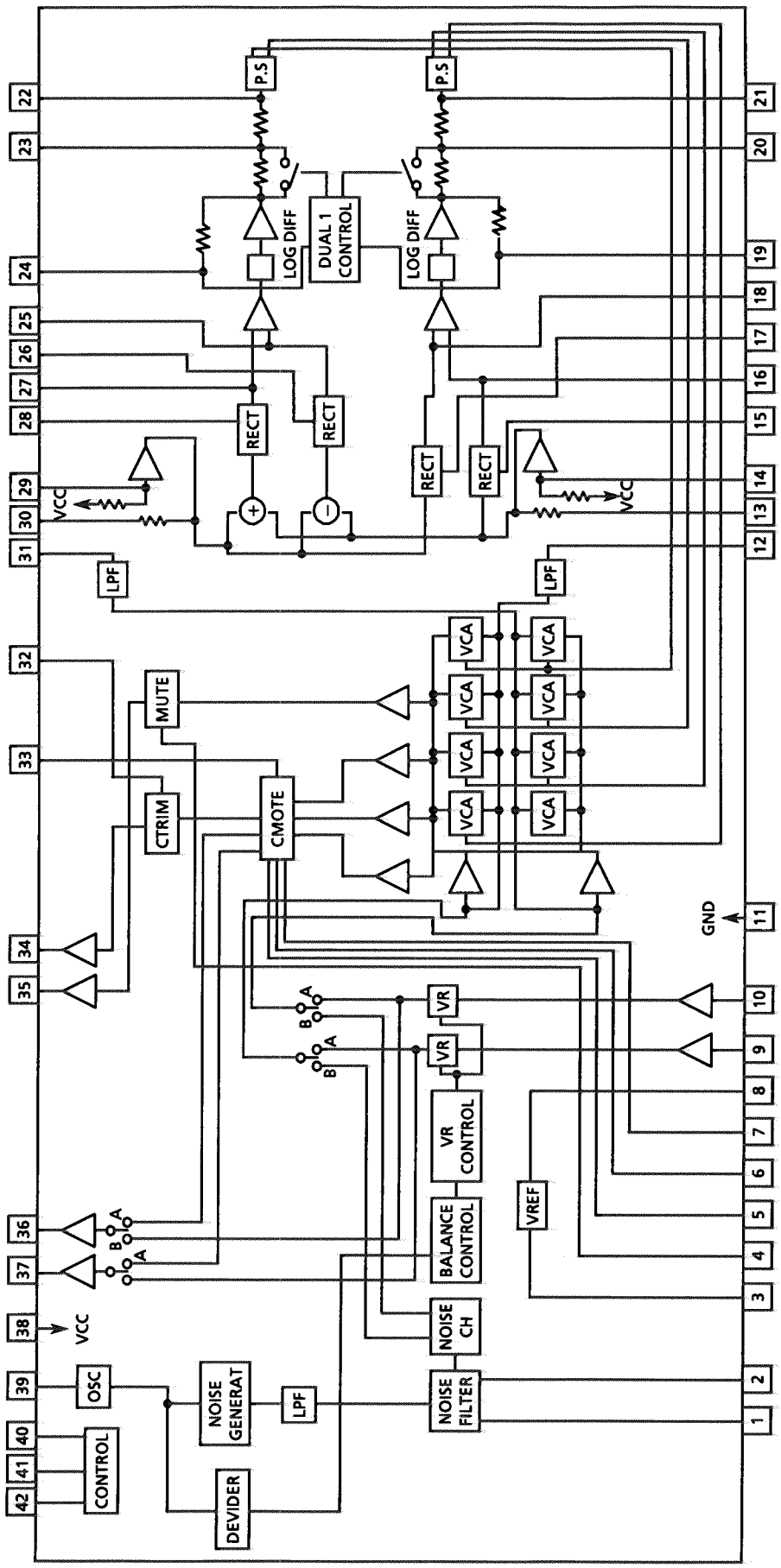
1. Terminal Layout



2. Pin Functions

Pin No	Symbol	I/O	Functions	Pin No	Symbol	I/O	Functions
1	NS-BPF1	--	Capacitor for spectrum filter in noise sequencer	22	VCS-1	--	Capacitor for time constant (in log differential area)
2	NS-BPF2	--	Capacitor for spectrum filter in noise sequencer	23	VCS-2	--	Capacitor for time constant (in log differential area)
3	VREF	--	Analog reference voltage	24	VCS-TH	--	Capacitor for time constant (in log differential area)
4	S-DC-OUT	--	Capacitor for DC-cut Sch	25	L+R RECT	--	Capacitor for Center channel detection
5	C-DC-OUT	--	Capacitor for DC-cut Cch	26	DC-CUT	--	Capacitor for DC-cut at detection circuit
6	L-DC-OUT	--	Capacitor for DC-cut Lch	27	L−R RECT	--	Capacitor for Surround channel detection
7	R-DC-OUT	--	Capacitor for DC-cut Rch	28	DC-CUT	--	Capacitor for DC-cut at detection circuit
8	VREF-BUFFER	--	VREF low impedance	29	R-BPF3	--	LPF,HPF for Right channel control circuit
9	L-IN	I	Left channel signal input	30	R-BPF2	--	LPF,HPF for Right channel control circuit
10	R-IN	I	Right channel signal input	31	R-BPF1	--	LPF,HPF for Right channel control circuit
11	GND	--	Ground	32	C-TRIM DC-CUT	--	Capacitor for DC-cut Center channel
12	L-BPF1	--	LPF,HPF for Lch control circuit	33	C-MODE-CAP	--	Capacitor for Center channel output low-pass filter
13	L-BPF2	--	LPF,HPF Left channel control circuit	34	C-OUT	O	Center signal output
14	L-BPF3	--	LPF,HPF Left channel control circuit	35	S-OUT	O	Surround signal output
15	DC-CUT	--	Capacitor for DC-cut at detection circuit	36	R-OUT	O	Right channel signal output
16	R RECT	--	Capacitor for Right channel detection	37	L-OUT	O	Left channel signal output
17	DC-CUT	--	Capacitor for DC-cut at detection circuit	38	VCC	--	power supply
18	L RECT	--	Capacitor for Left channel detection	39	OSC	--	Oscillation for noise sequencer and auto balance
19	VLR-TH	--	Capacitor for time constant (in log differential area)	40	STB	I	Strobe signal input
20	VLR-2	--	Capacitor for time constant (in log differential area)	41	DATA	I	Serial interface data input
21	VLR-1	--	Capacitor for time constant (in log differential area)	42	CLK	I	Serial interface clock

3. Block Diagram

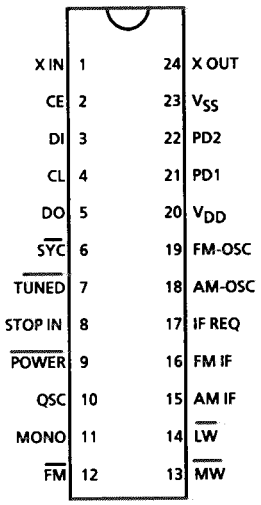


■ LC7218M (IC121) : PLL Synthesizer

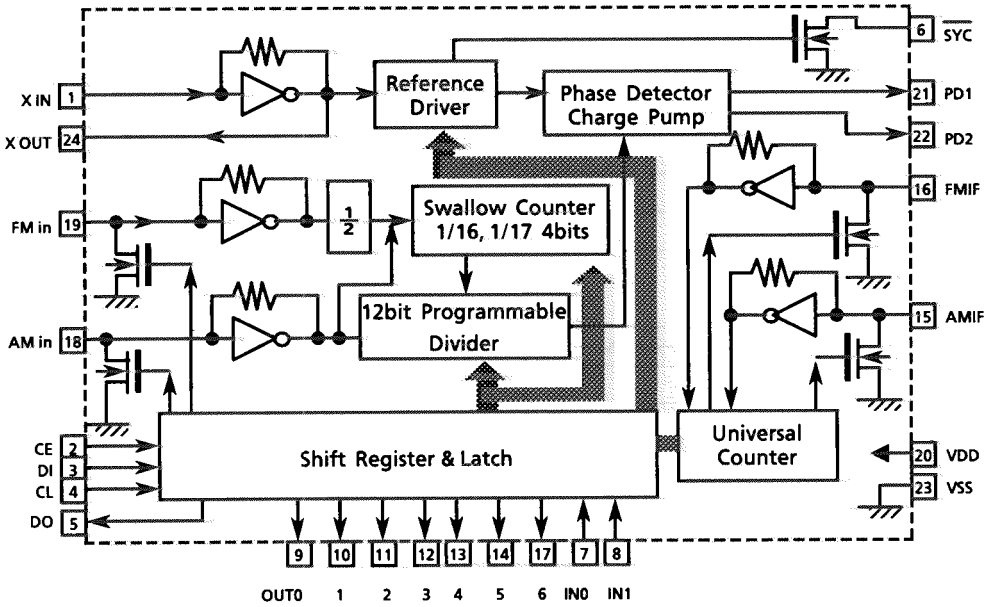
1. The main function descriptions

(1) It makes the local oscillation frequency by the control data from IC401.
(2) Decode the control signal and transmit the signal for receiving conditions.
(3) For the best tuning, count the internal-frequency and transmit the data to IC201.

2. Terminal Layout



3. Block Diagram

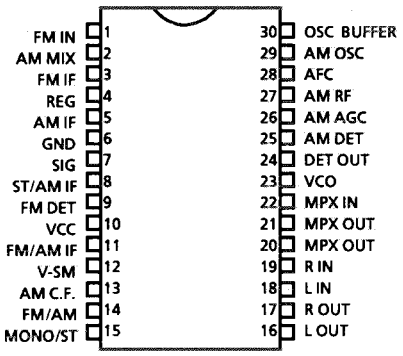


4. Pin Functions

Pin No.	Symbol	I/O	Functions
1,24	X in , X out	I/O	Crystal oscillator (7.2MHz).
2	CE	I	Fix the chip enable to "H" when inputting (DI) and outputting (DO) the serial data.
3	DI	I	Receive the control data from the controller (IC401).
4	CL	I	This clock is used to synchronize data when transmitting the data of DI and DO.
5	DO	O	Transmit the data from LC7218JM to the controller which is synchronized with CL.
6	SYC	—	Not used.
7	TUNED	I	Receive the tuned signal from IC102 (LA1836M).
8	STOP IN	—	Connected to GND
9	POWER	—	Not used.
10	QSC	—	Not used.
11	MONO	O	It is "H" on FM-monaural, "L" on FM-Stereo.
12	FM	O	It is "L" on FM mode.
13	MW	O	It is "L" on MW mode.
14	LW	O	It is "L" on LW mode.
15	AM-IF	I	Universal counter input for AM-IF from IC102 (LA1836M).
16	FM-IF	I	Universal counter input for FM-IF from IC102 (LA1836M).
17	IF REQ	O	Output the "IF-signal request" to IC102 when the pin-7 (tuned in) goes to "H".
18	AM OSC	I	Input the local oscillator signal of AM.
19	FM OSC	I	Input the local oscillator signal of FM.
20	V_{DD}	—	This is a terminal of power supply.
21	PD1	O	PLL charge pump output : When the local oscillator signal frequency is higher than the reference frequency high level signals will output. When it is lower than the reference frequency, low level signals will output. When it is same as reference frequency signals, it will be floating.
22	PD2	—	Not used.
23	Vss	—	Connected to GND

■ LA1836M (IC102) : FM AM IF AMP & detector, FM MPX DECORDER

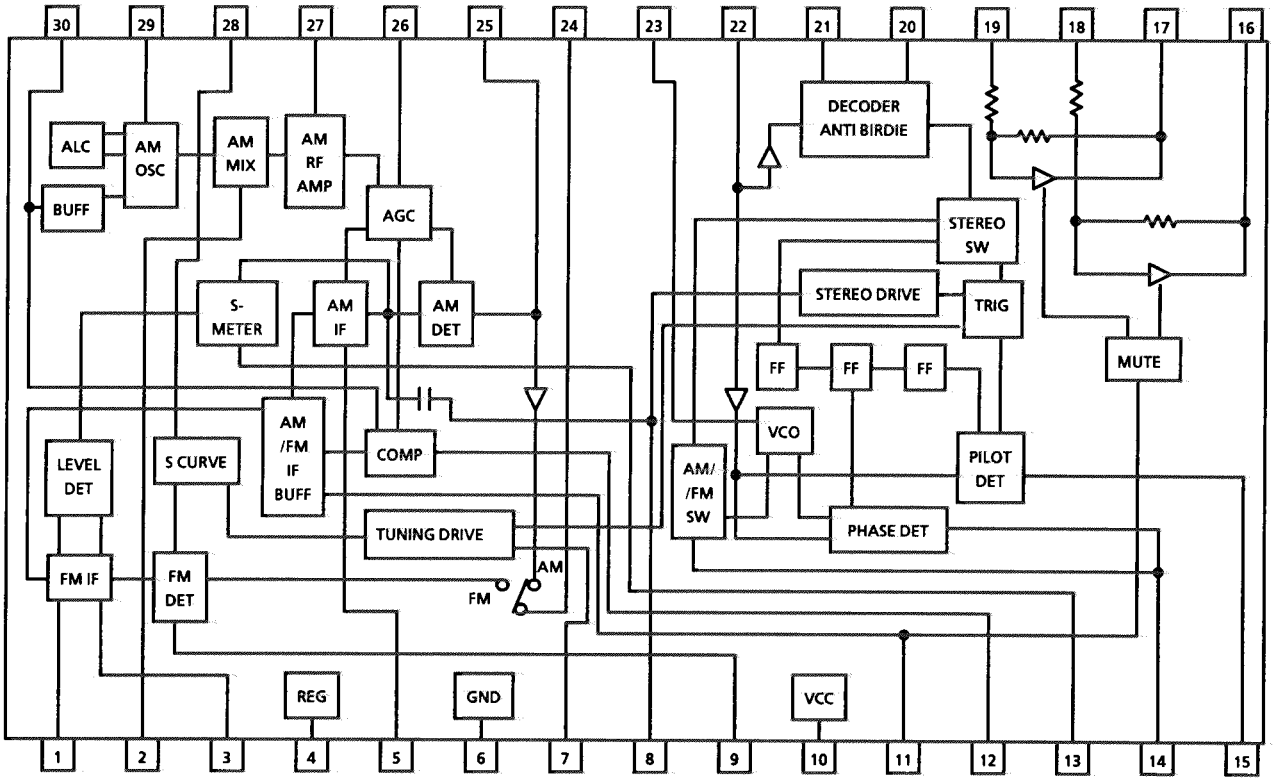
1. Terminal Layout



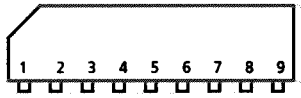
3. Pin Function

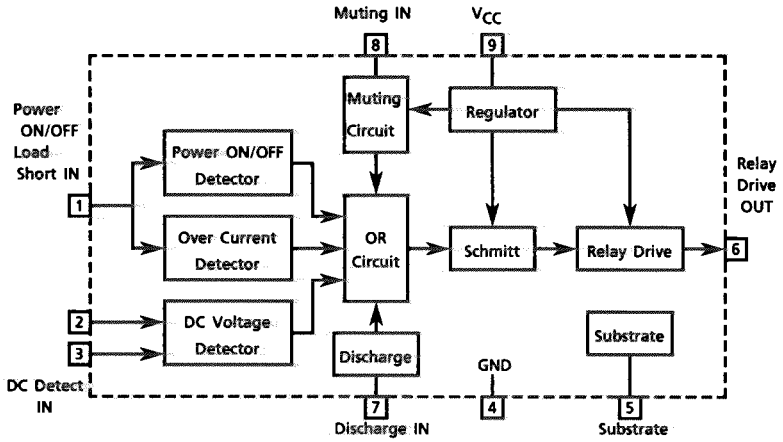
Pin No.	Symbol	I/O	Function
1	FM IN	I	This is an input terminal of FM IF Signal.
2	AM MIX	O	This is an output terminal for AM mixer.
3	FM IF	I	Bypass of FM IF
4	REG	—	Register value between pin4 and pin28 desides the frequency width of the input signal.
5	AM IF	I	Input of AM IF Signal.
6	GND	—	This is the device ground terminal.
7	SIG	O	When the set is tunning, this terminal becomes "L".
8	ST/AM IF	O	Stereo indicator output. Stereo : "L", Mono : "H"
9	FM DET	—	FM detect transformer.
10	VCC	—	This is the power supply terminal.
11	FM/AM IF //MUTE	O/I	When the signal of IF REQ of IC121(LC7218JM) appear, the signal of FM/AM IF output. //Muting control input.
12	VSM	O	S Meter output and adjust AM SD sensitivity.
13	AM C.F.	O	This is a terminal of AM ceramic filter.
14	FM/AM	I	Change over the FM / AM input. "H" : FM, "L" : AM
15	MONO/ST	O	Stereo : "H", Mono : "L"
16	L OUT	O	Left channel signal output.
17	R OUT	O	Right channel signal output
18	L IN	I	Input terminal of the Left channel post AMP.
19	R IN	I	Input terminal of the Right channel post AMP.
20	MPX L OUT	O	Mpx Left channel signal output.
21	MPX R OUT	O	Mpx Right channel signal output.
22	MPX IN	I	Mpx input terminal.
23	VCO	I	Voltage controlled oscillator terminal.
24	DET OUT	O	AM/FM detection output.
25	AM DET	—	AM low cut adjustment.
26	AM AGC	I	This is an AGC voltage input terminal for AM.
27	AM RF	I	This is an input terminal for AM RF signal.
28	AFC	—	This is an output terminal of voltage for FM-AFC.
29	AM OSC	—	This is a terminal of AM Local oscillation circuit.
30	OSC BUFFER	O	AM Local oscillation Signal output.

2. Block Diagram

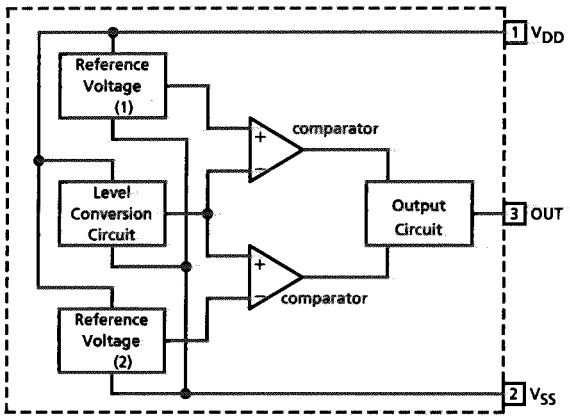


■ TA7317P (IC901) : Protector



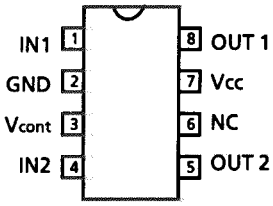


■ MN1281(P.Q) (IC403) : Reset IC



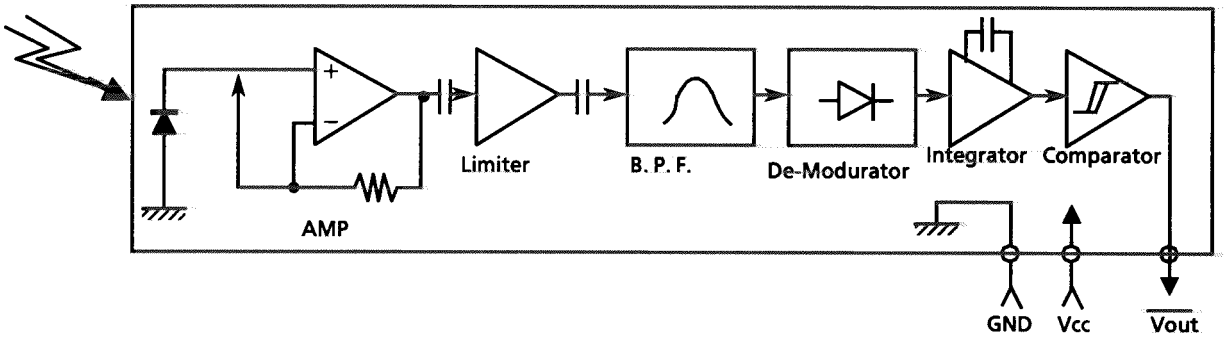
Pin No.	Pin Name	Functions
1	V_{DD}	Power supply
2	V_{SS}	Ground
3	OUT	Reset signal output : Low level is output when resetting : High level is output when cancelling the reset.

■ LB1639-CV (IC511) : Motor Driver

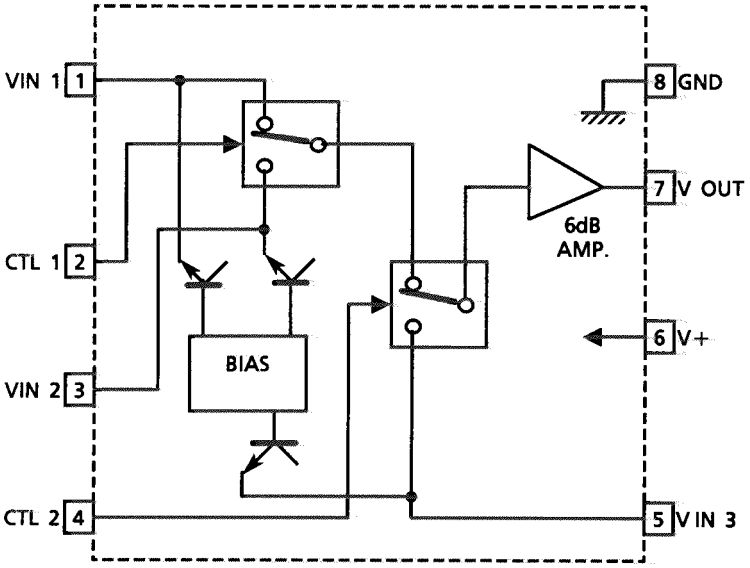


IN 1	IN 2	OUT 1	OUT 2	MOTOR
H	L	H	L	CLOCKWISE
L	H	L	H	COUNTER-CLOCKWISE
H	H	OFF	OFF	WAITING
L	L	OFF	OFF	WAITING

■ SPS-420-1 (IC402) : Remote Control Module IC



■ NJM2246D (IC661) : Video Switch

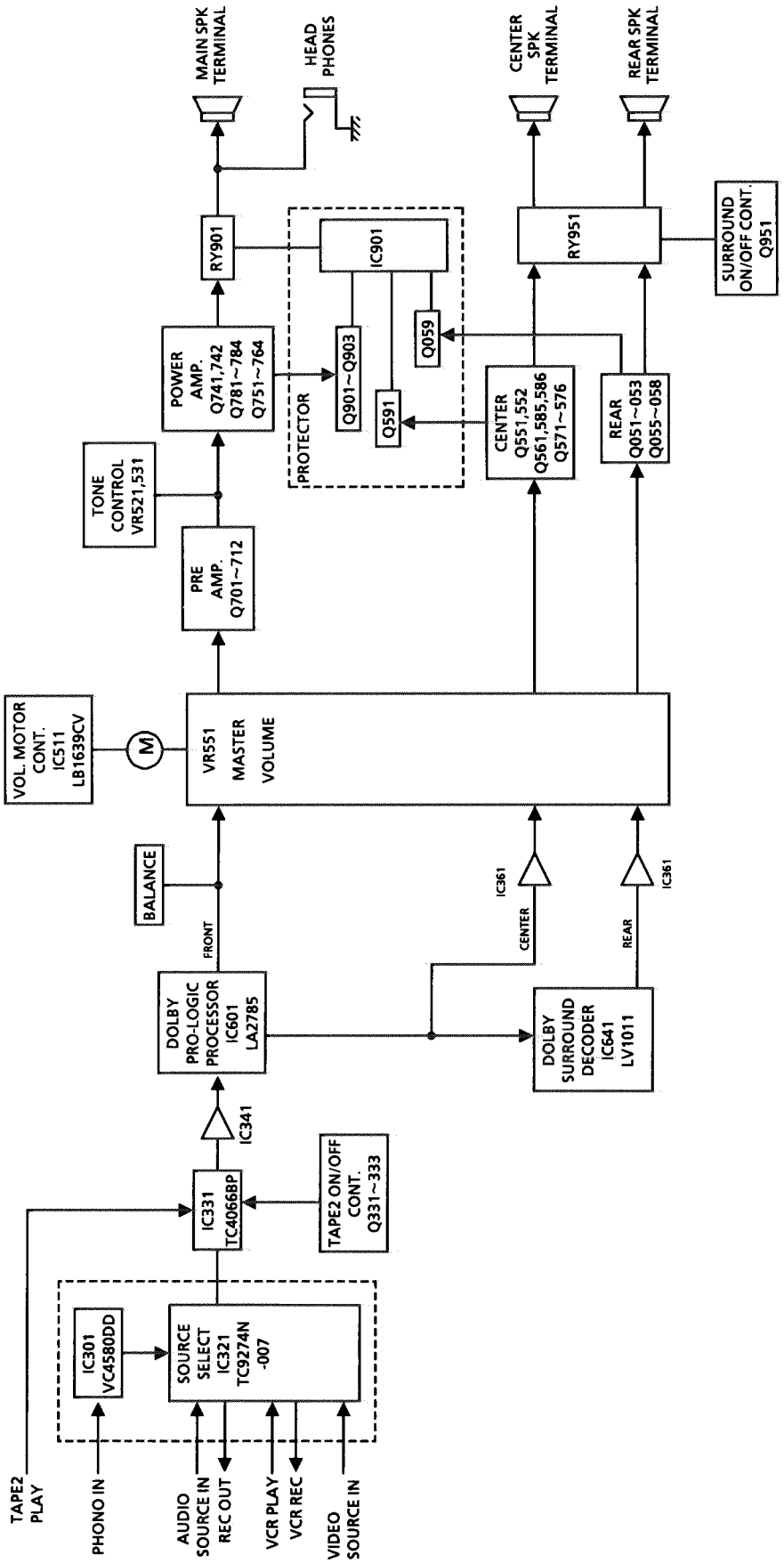


Control Signal—OutputSignal

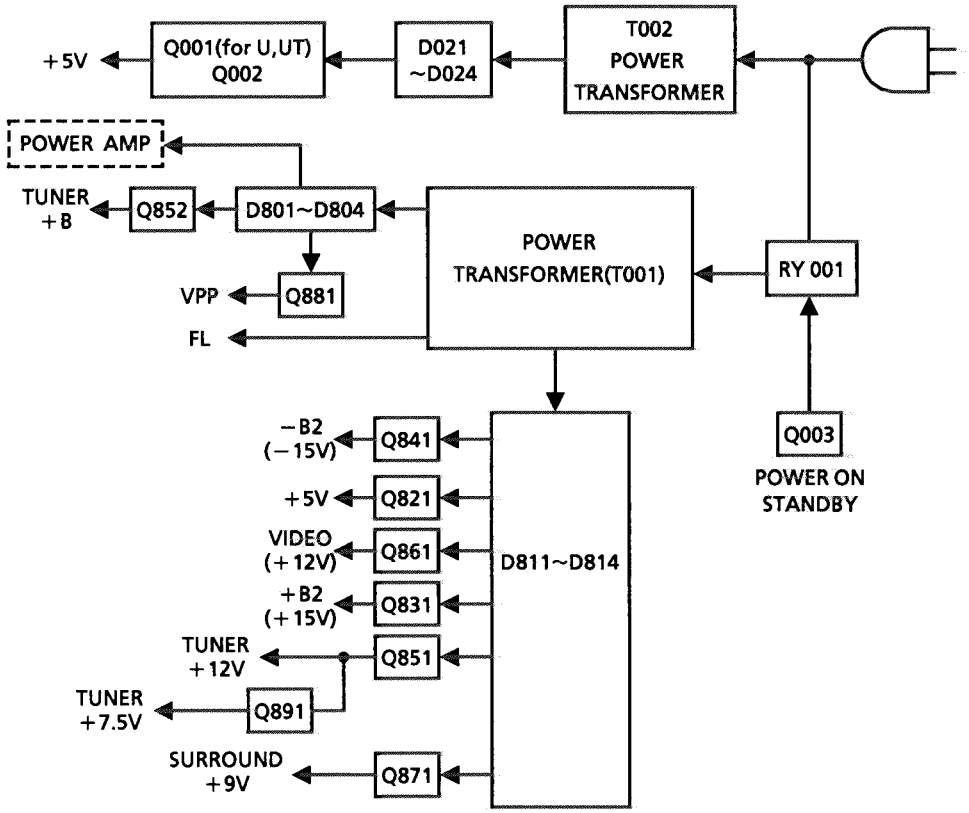
CTL 1	CTL 2	Output
L	L	V IN 1
H	L	V IN 2
L / H	H	V IN 3

Block Diagrams

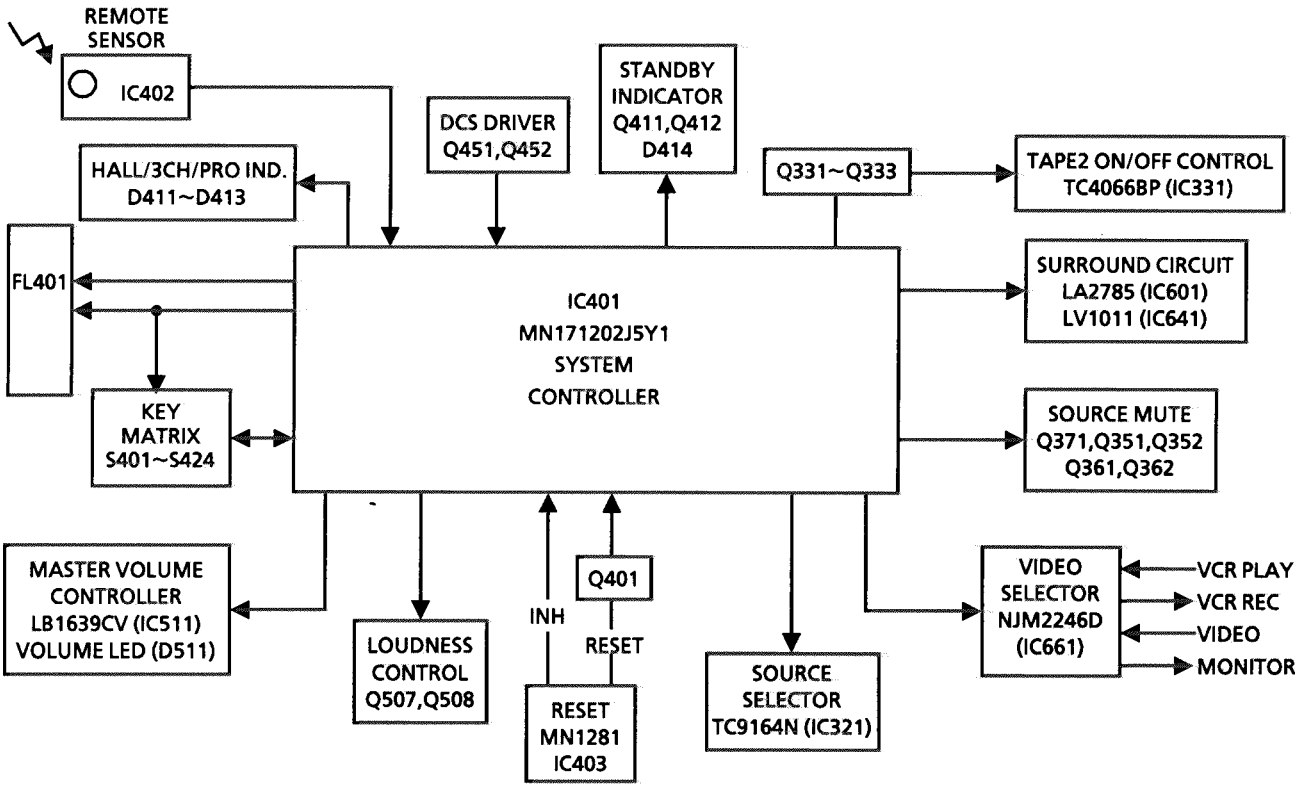
■ Signal Flow Section



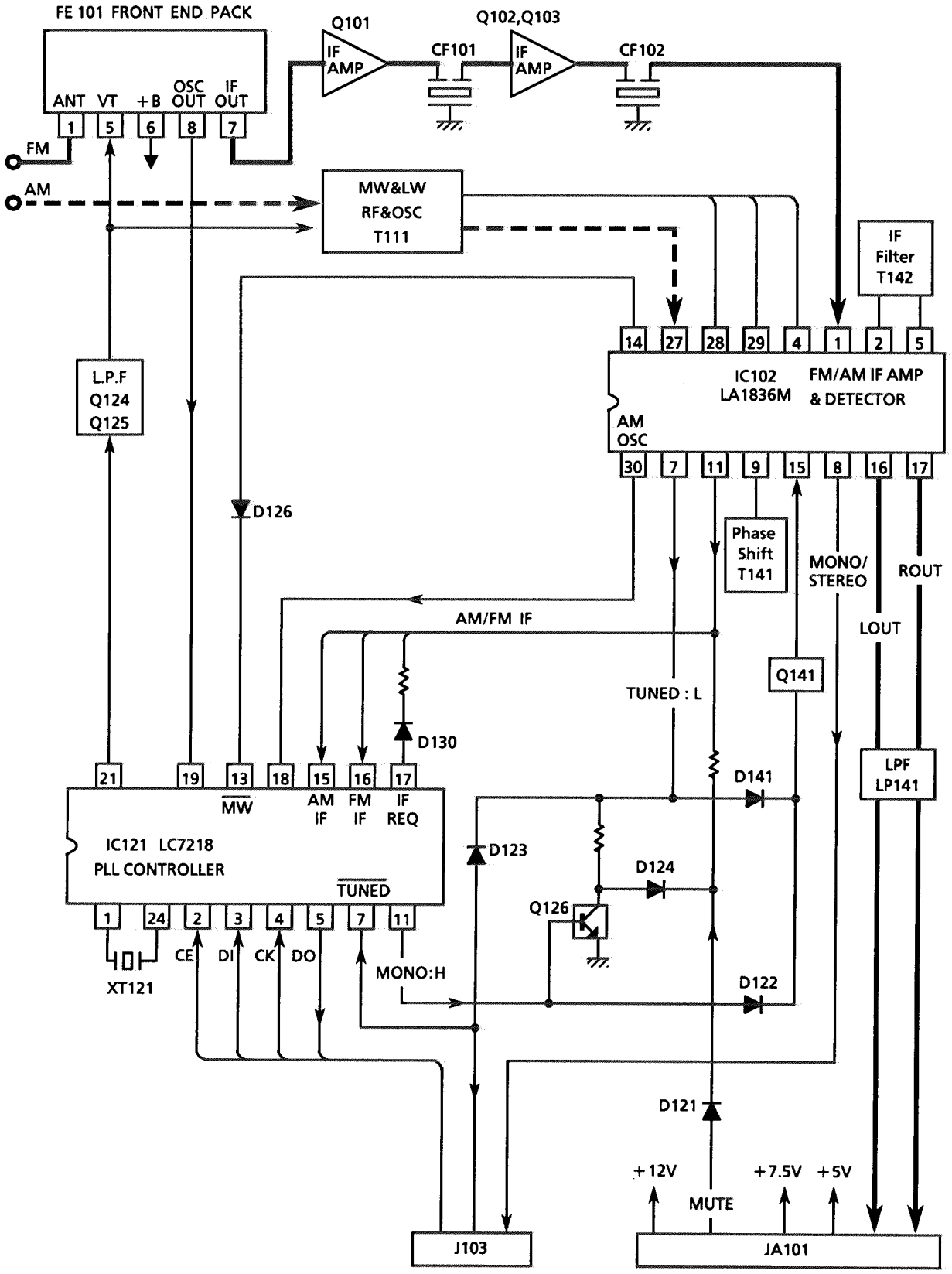
■ Power Supply Section



■ Control Section

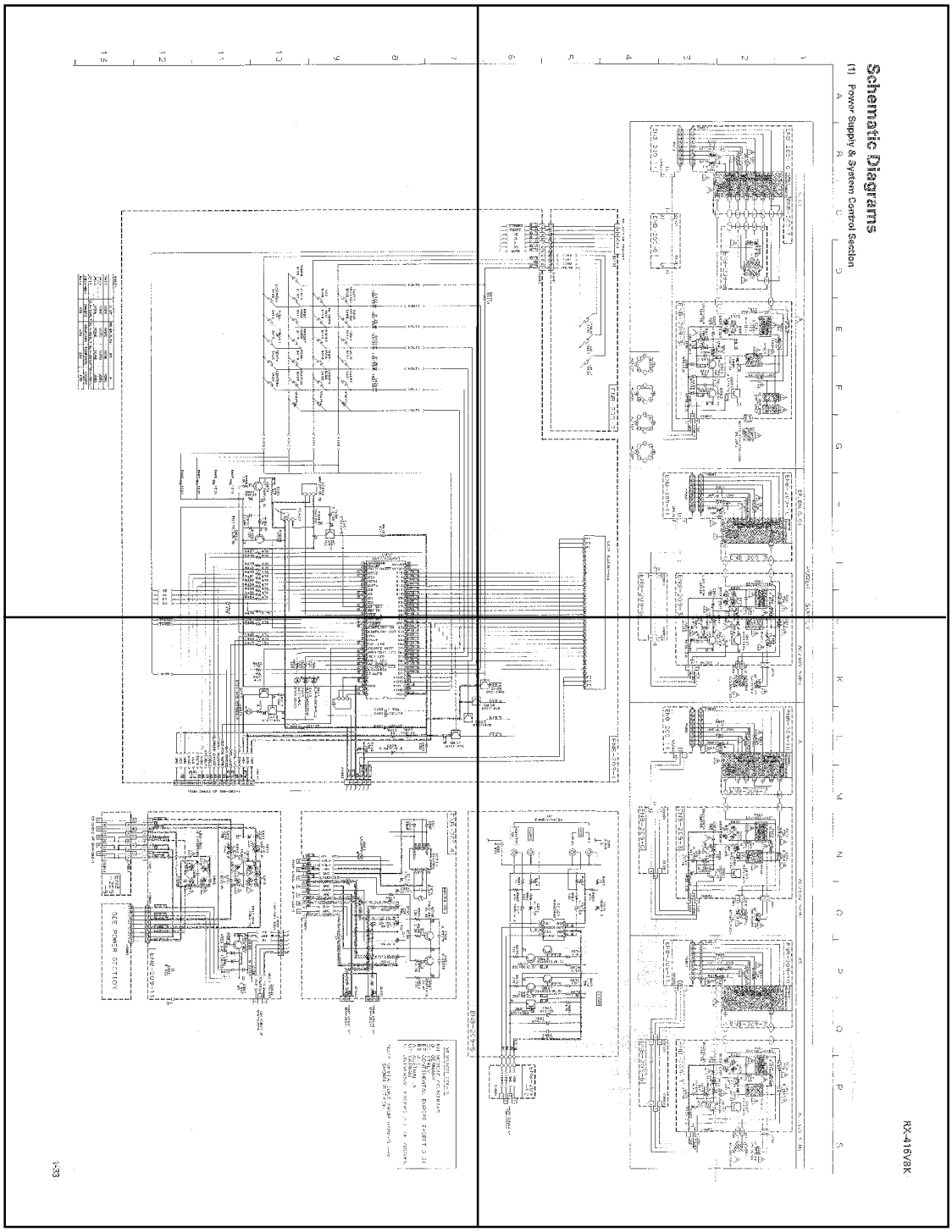


■ Tuner Section

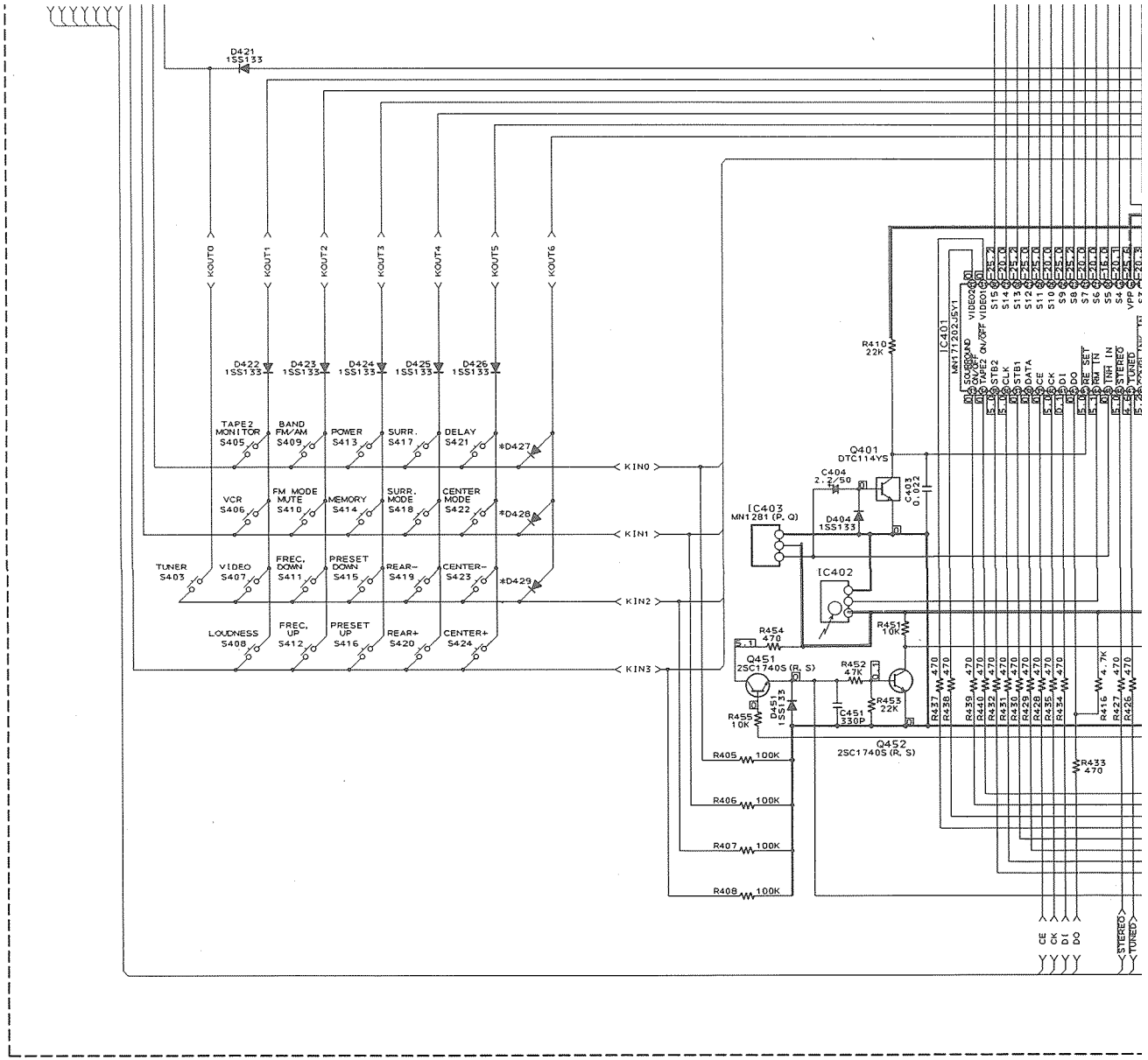


— MEMO —

P1-33-a P1-33-b



P1-33-c P1-33-d

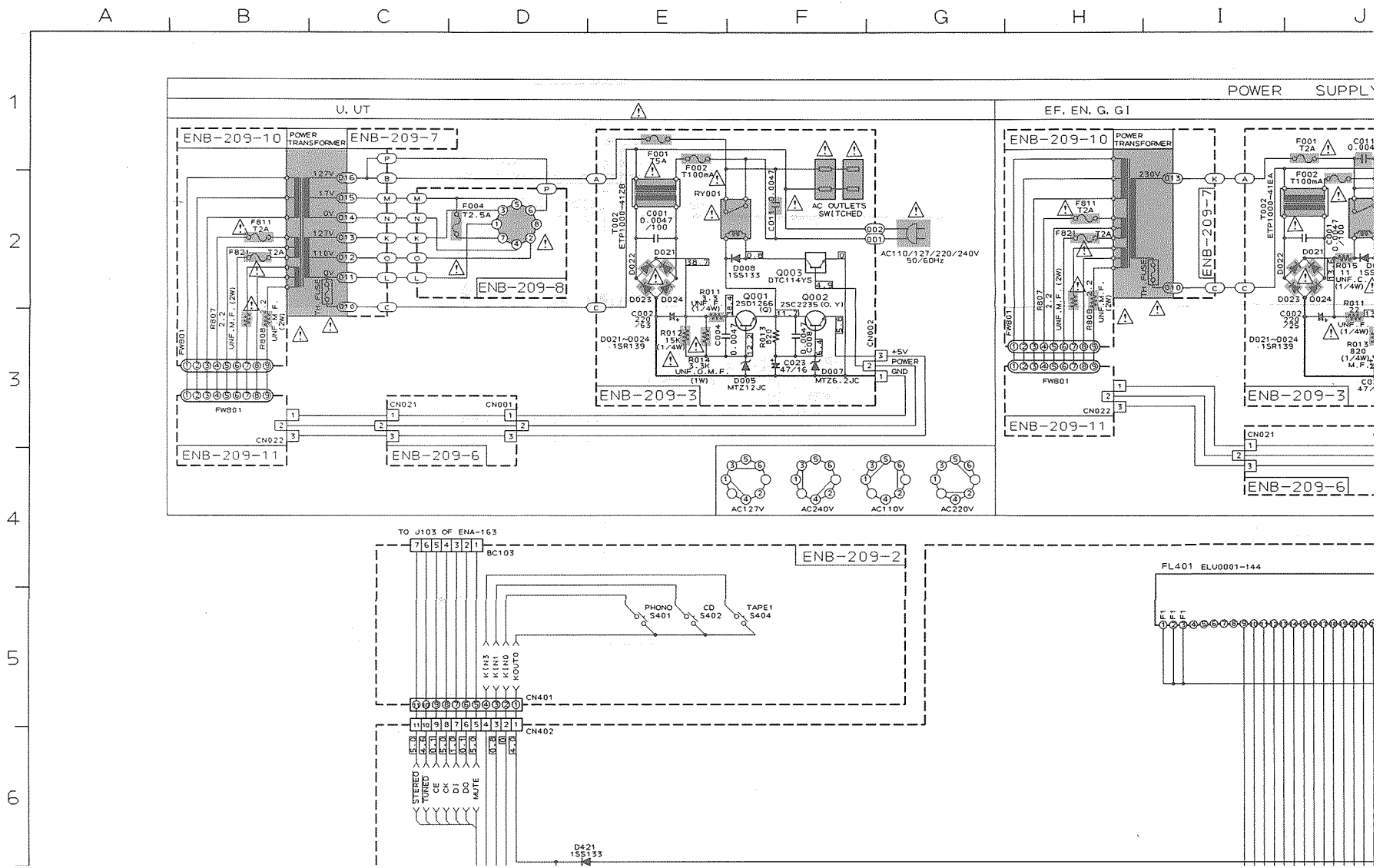


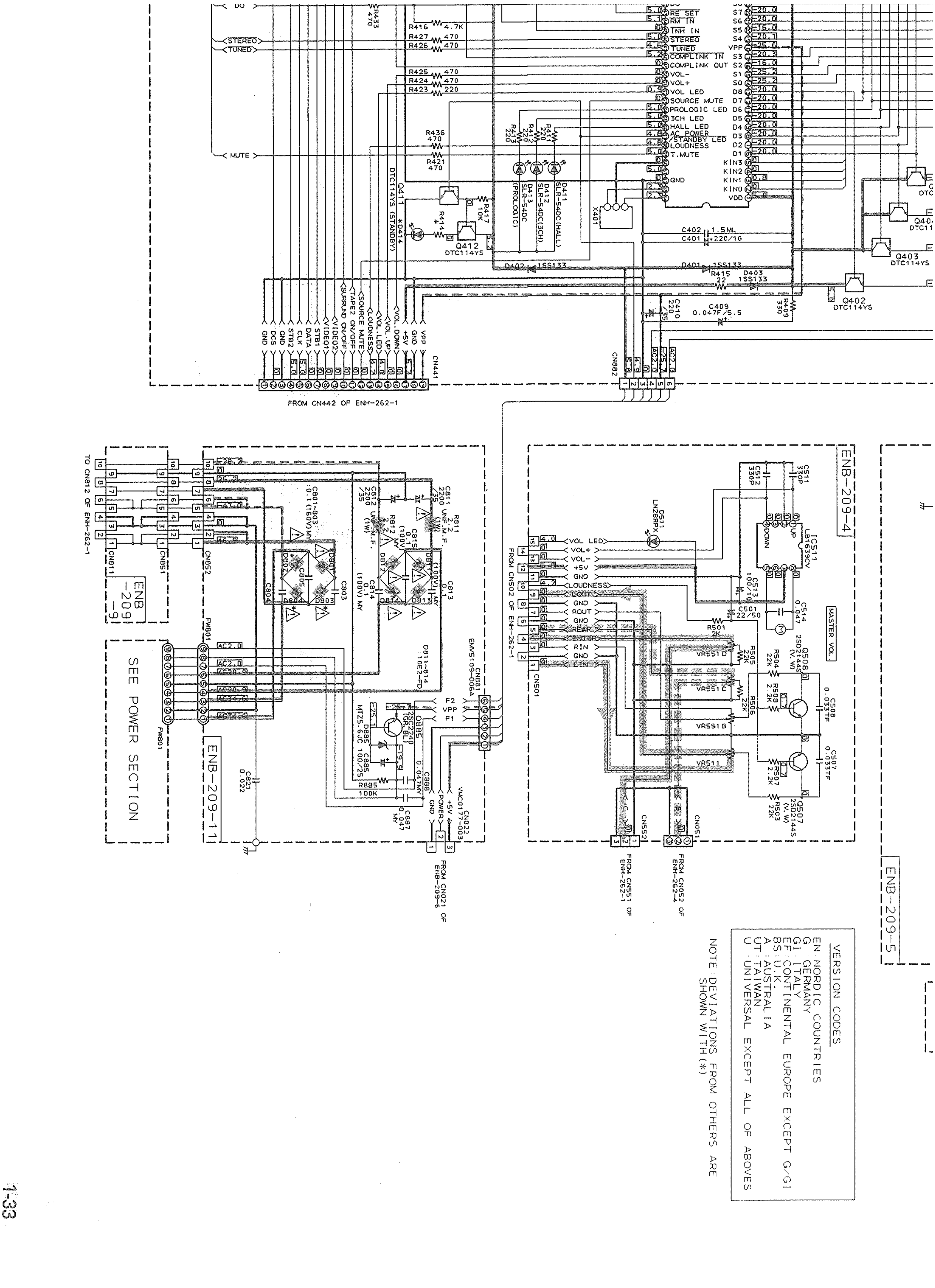
*MARK

	U, UT	EN, EF, G, GI	BS	A
D427	USED	NONE	NONE	NONE
D428	NONE	USED	USED	USED
D429	NONE	NONE	NONE	USED
D414	SLA-380LT	SLA-380LT	SLA-380JT	SLA-380LT
D801-804	30D2FC	30DF2SFC	30DF2SFC	30D2FC
R414	430	430	220	430

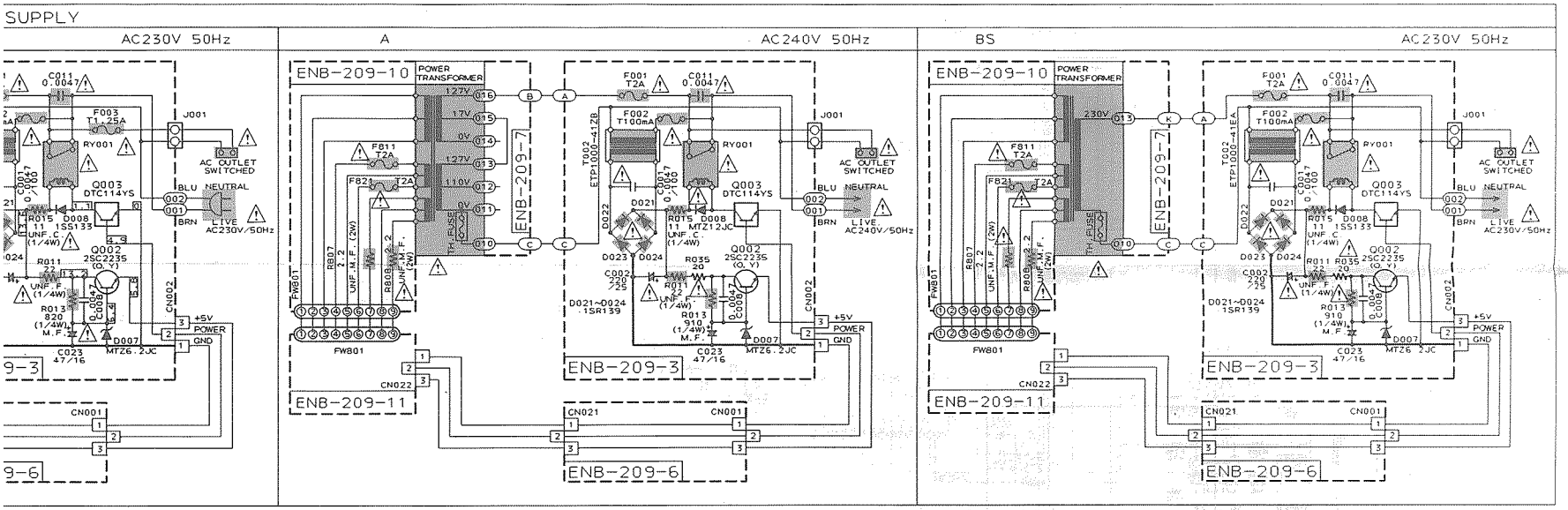
Schematic Diagrams

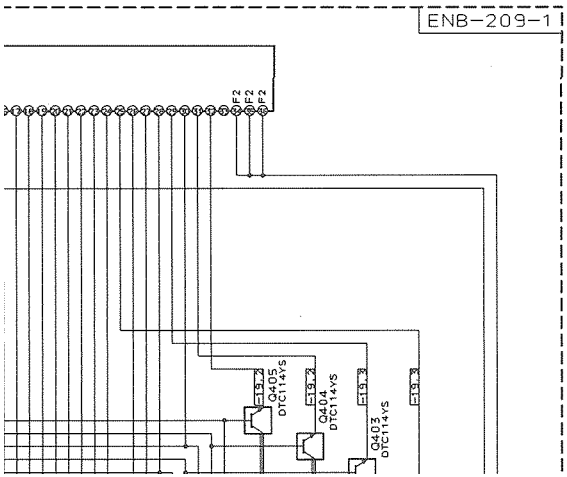
(1) Power Supply & System Control Section

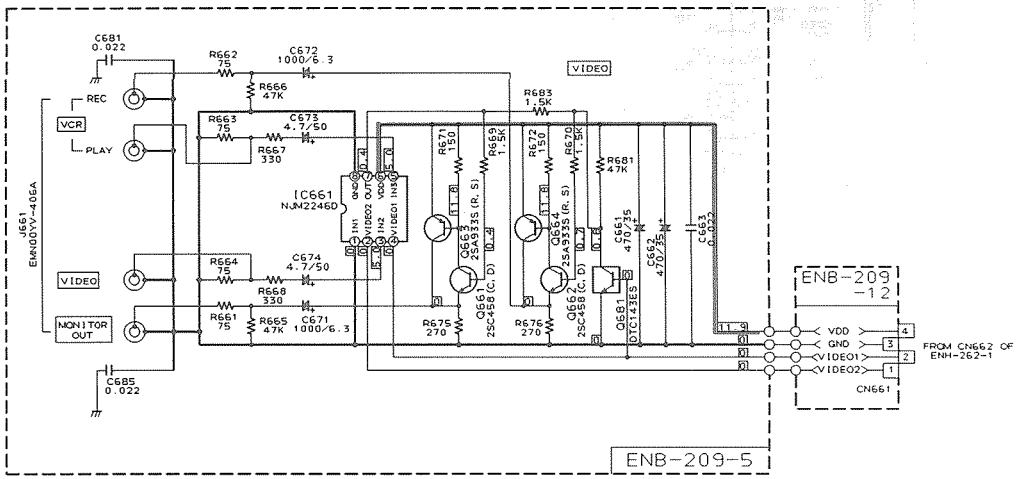



VERSION CODES
EN : NORDIC COUNTRIES
GI : GERMANY
G : ITALY
EF : CONTINENTAL EUROPE EXCEPT G/GI
BS : U.K.
A : AUSTRALIA
UT : TAIWAN
U : UNIVERSAL EXCEPT ALL OF ABOVES
NOTE: DEVIATIONS FROM OTHERS ARE SHOWN WITH (*)
SEE POWER SECTION
ENB-209-4
ENB-209-5
ENB-209-9
ENB-209-11
1-33

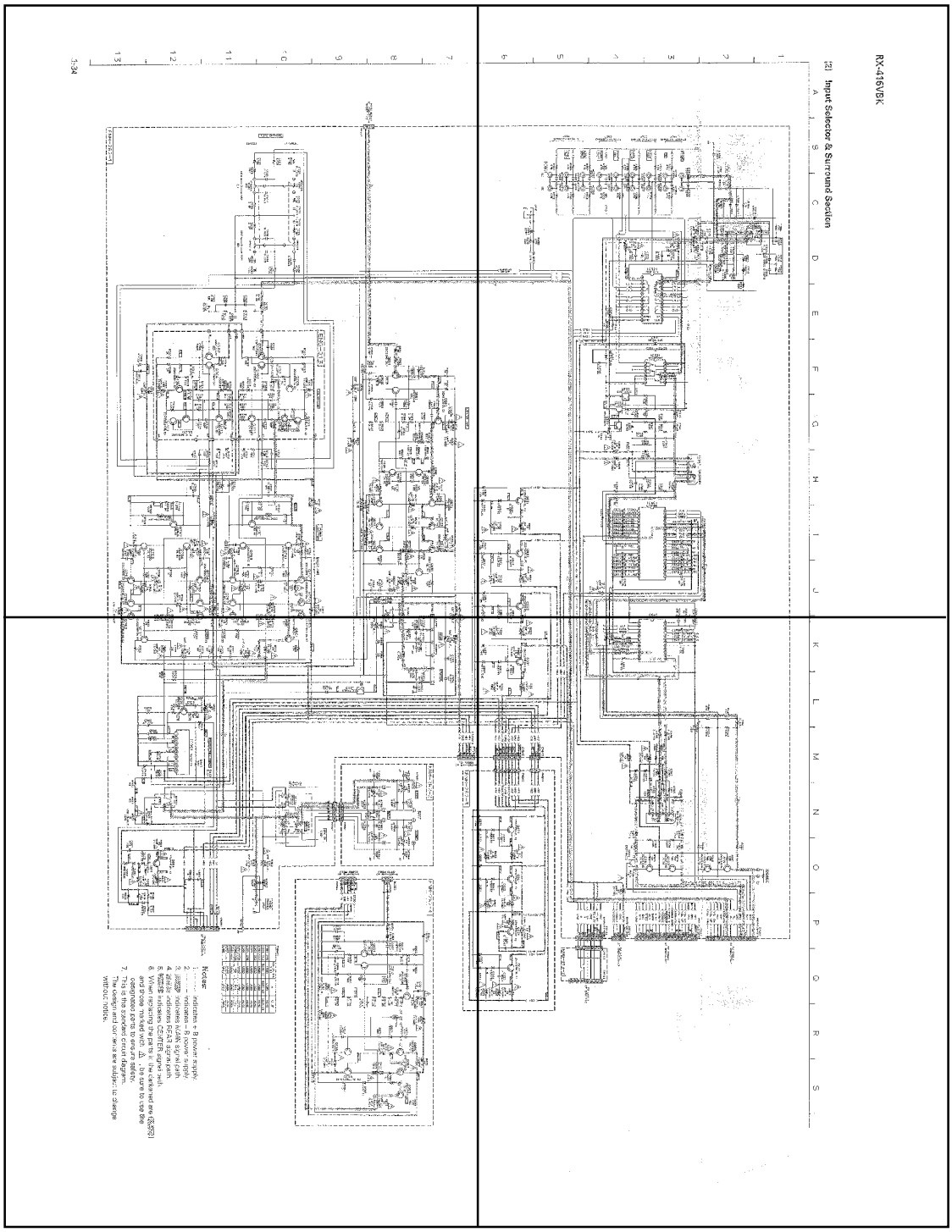
J K L M N O P Q R S


SUPPLY
AC230V 50Hz
A
AC240V 50Hz
B
AC230V 50Hz
ENB-209-10
POWER TRANSFORMER
ENB-209-7
ENB-209-3
ENB-209-11
ENB-209-6
FW801
CN022
CN021
CN001
CN002
J001
AC OUTLET SWITCHED
BLU NEUTRAL
BRN LIVE
AC230V/50Hz
AC240V/50Hz
POWER
GND
+5V

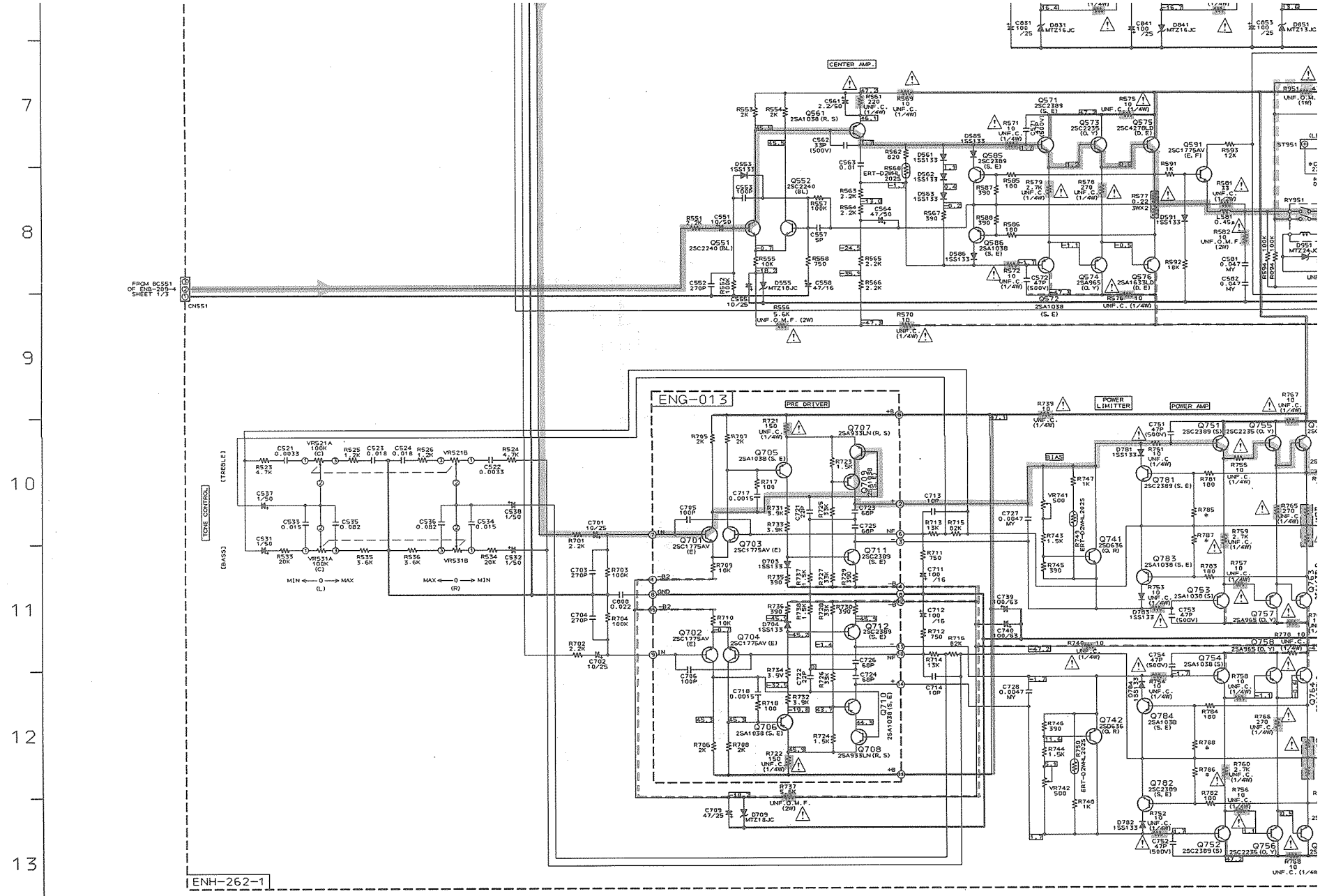

ENB-209-1
Q405 DTC114YS
Q404 DTC114YS
Q403 DTC114YS


ENB-209-5
IC661 NJM2246D
J661 EKN10YY-406A
REC
VCR
PLAY
VIDEO
MONITOR OUT
ENB-209-12
VDD
GND
VIDEO1
VIDEO2
CN661
FROM CN662 OF ENH-262-1

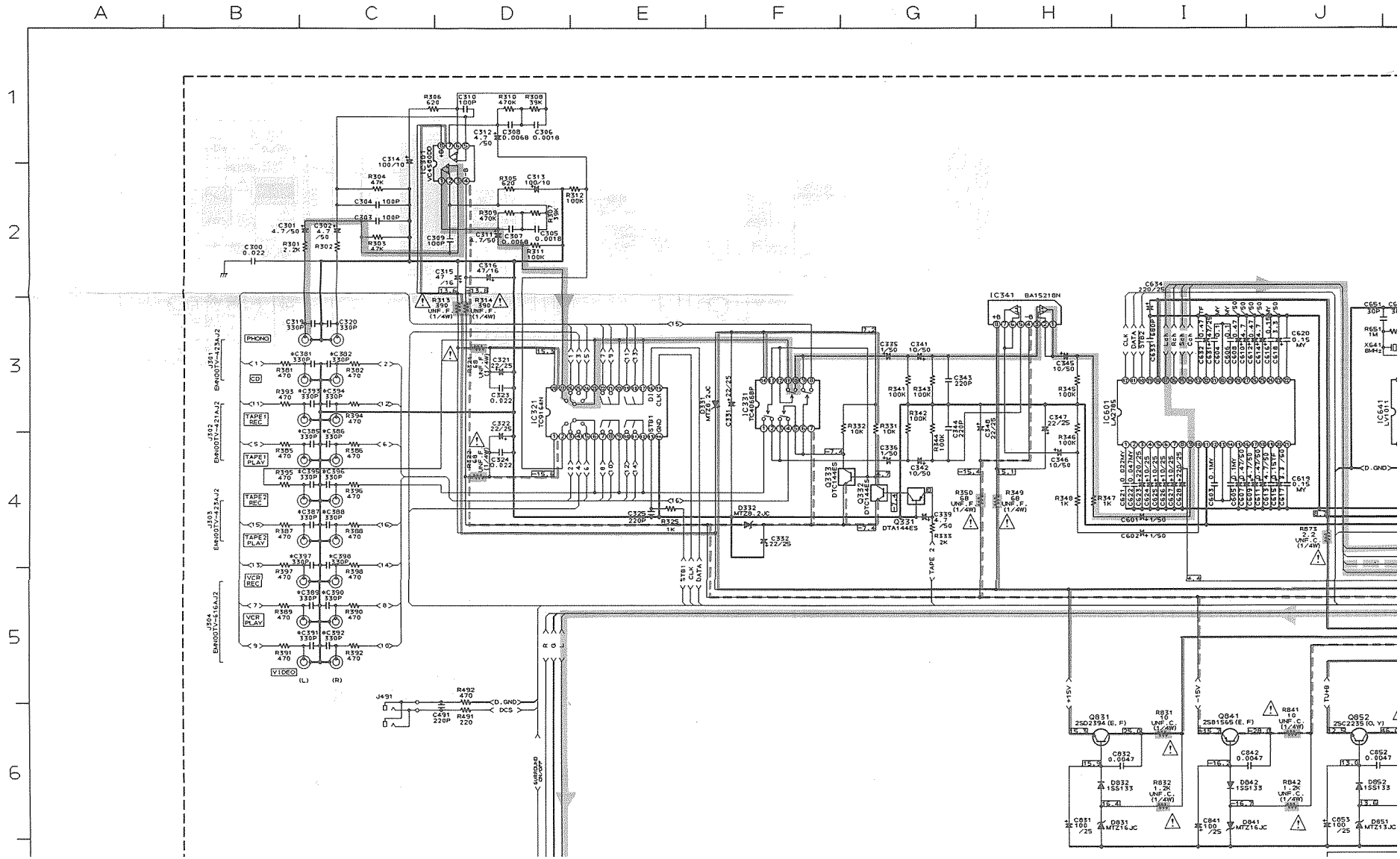
P1-34-a P1-34-b

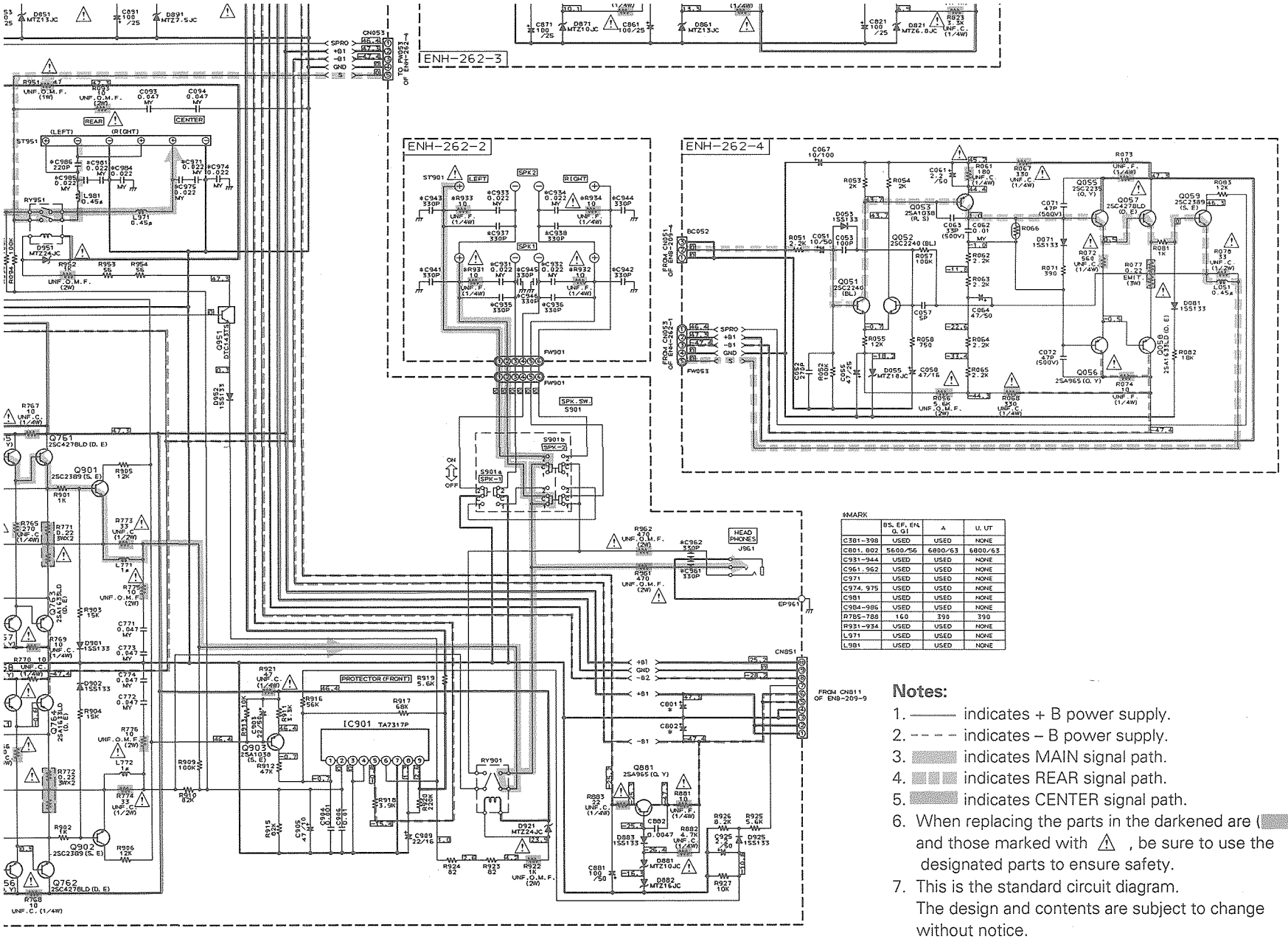


P1-34-c P1-34-d


CENTER AMP.
ENG-013
PRE DRIVER
POWER LIMITTER
POWER AMP
BIAS
TONE CONTROL
(TREBLE)
(BASS)
FROM BC551 OF ENB-209-4 SHEET 1/3
CN551
ENH-262-1
7
8
9
10
11
12
13

(2) Input Selector & Surround Section



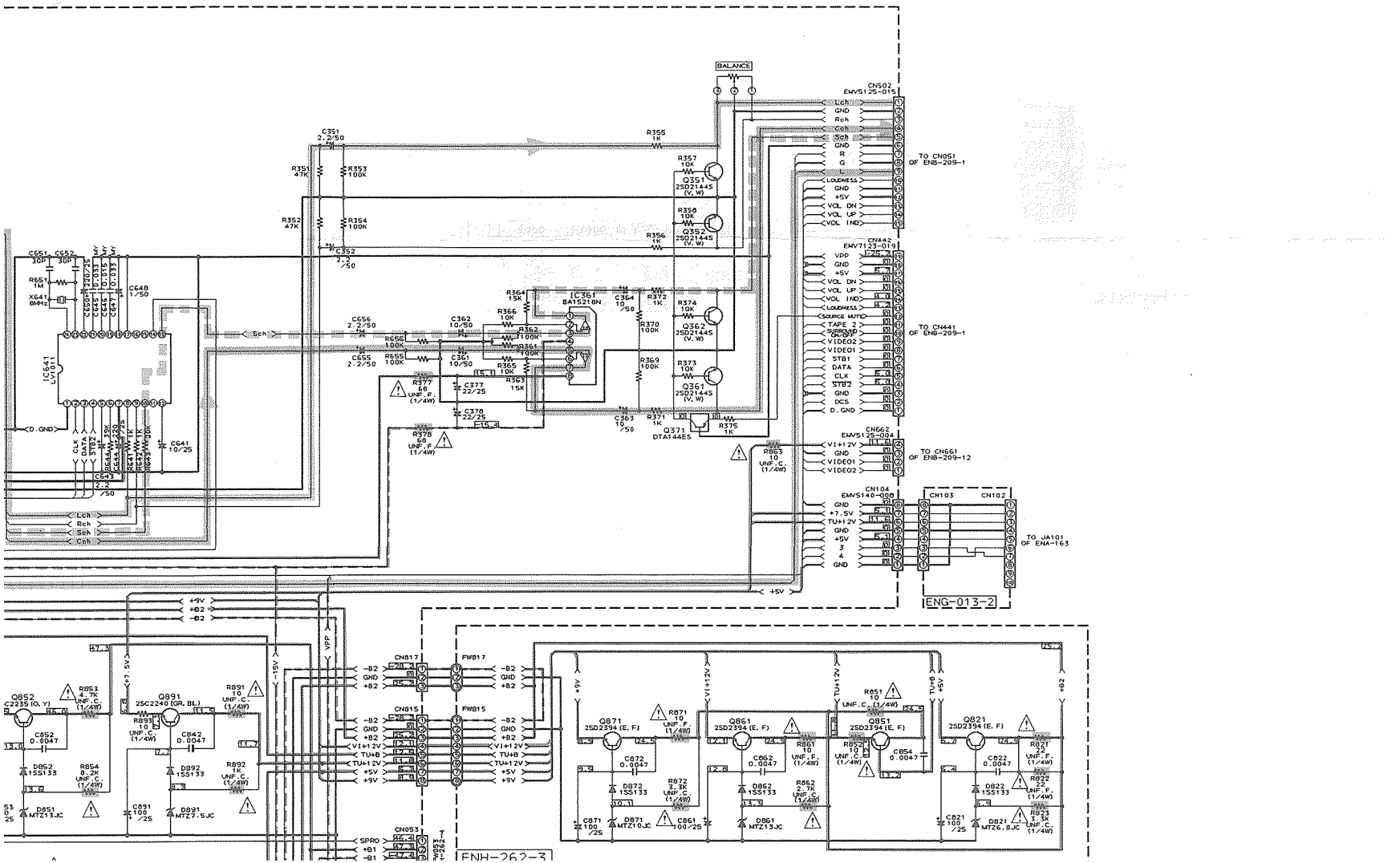


※MARK	BS, EF, EN, G, GI	A	U, UT
C381-398	USED	USED	NONE
C801, 802	5600/56	6800/63	6800/63
C931-944	USED	USED	NONE
C961, 962	USED	USED	NONE
C971	USED	USED	NONE
C974, 975	USED	USED	NONE
C981	USED	USED	NONE
C984-986	USED	USED	NONE
R785-788	160	390	390
R931-934	USED	USED	NONE
L971	USED	USED	NONE
L981	USED	USED	NONE

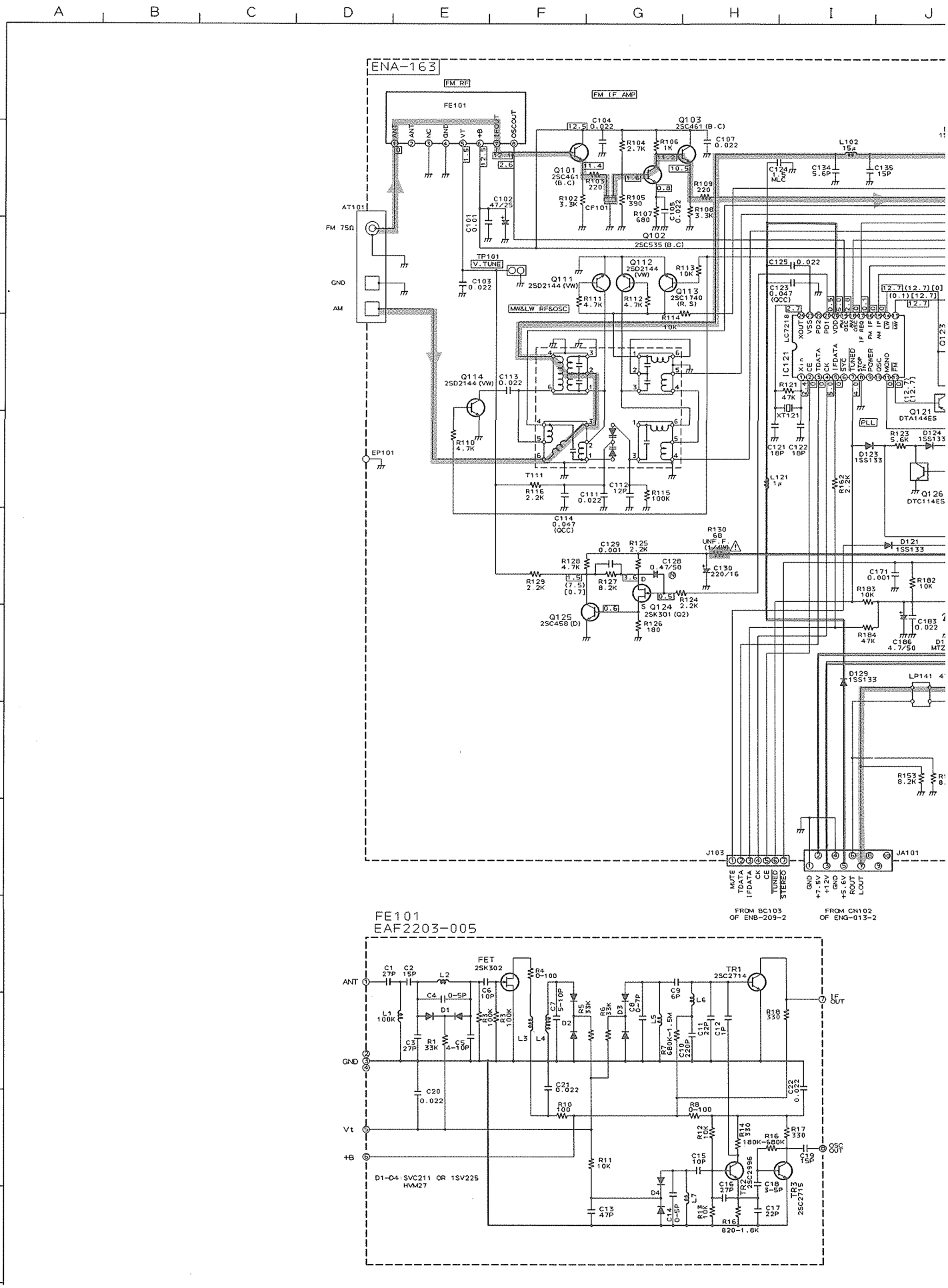
Notes:

1. ——— indicates + B power supply.
2. - - - - indicates – B power supply.
3. ▒▒▒ indicates MAIN signal path.
4. ▒▒▒ indicates REAR signal path.
5. ▒▒▒ indicates CENTER signal path.
6. When replacing the parts in the darkened are (▒▒▒) and those marked with ⚠ , be sure to use the designated parts to ensure safety.
7. This is the standard circuit diagram. The design and contents are subject to change without notice.

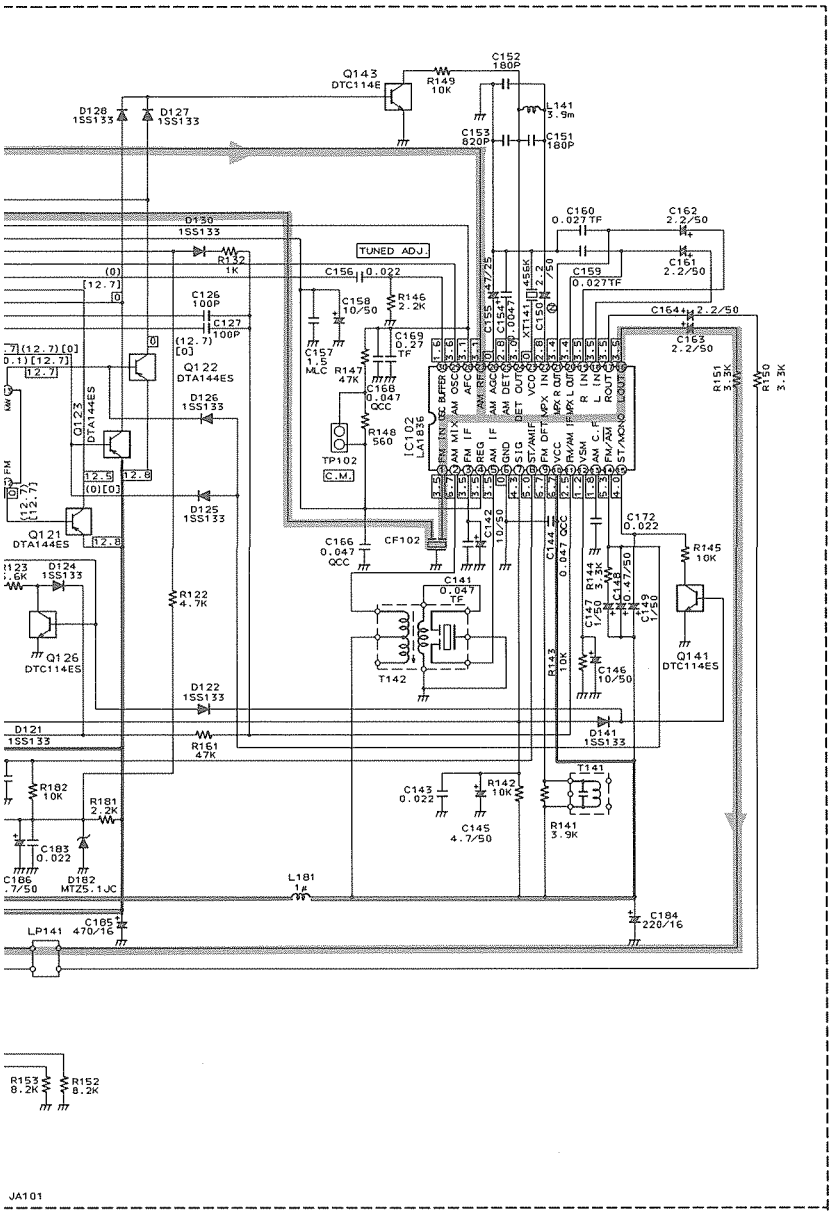
K L M N O P Q R S


BALANCE
CN502
EMV5125-015
TO CN051
OF ENB-209-1
CN442
EMV7123-019
TO CN441
OF ENB-209-1
CN562
EMV5125-004
TO CN561
OF ENB-209-12
CN104
EMV5140-000
CN103
CN102
TO JA101
OF ENA-163
ENG-013-2
IC641
LV1011
IC361
BA15218N
Q351
2SD2144S
(V, W)
Q352
2SD2144S
(V, W)
Q362
2SD2144S
(V, W)
Q361
2SD2144S
(V, W)
Q371
DTA144ES
Q852
2SC2240 (O, Y)
Q891
2SC2240 (GR, BL)
Q871
2SD2394 (E, F)
Q861
2SD2394 (E, F)
Q851
2SD2394 (E, F)
Q821
2SD2394 (E, F)
CN817
FW817
CN815
FW815
CN053
ENH-262-3
D.GND
+5V
+B2
-B2
+7.5V
-15V
VPP

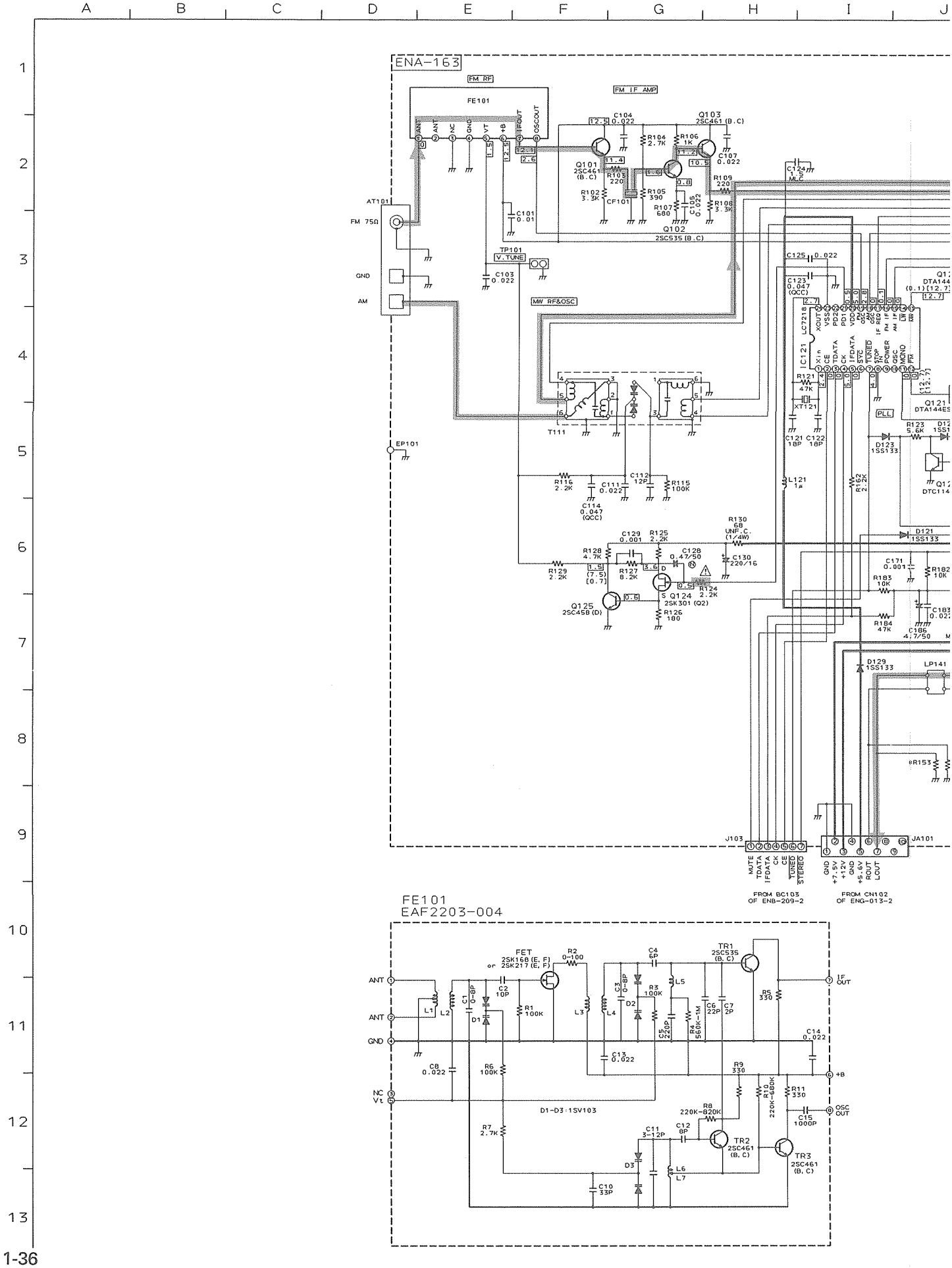
(3) Tuner Section (For BS, E, G)



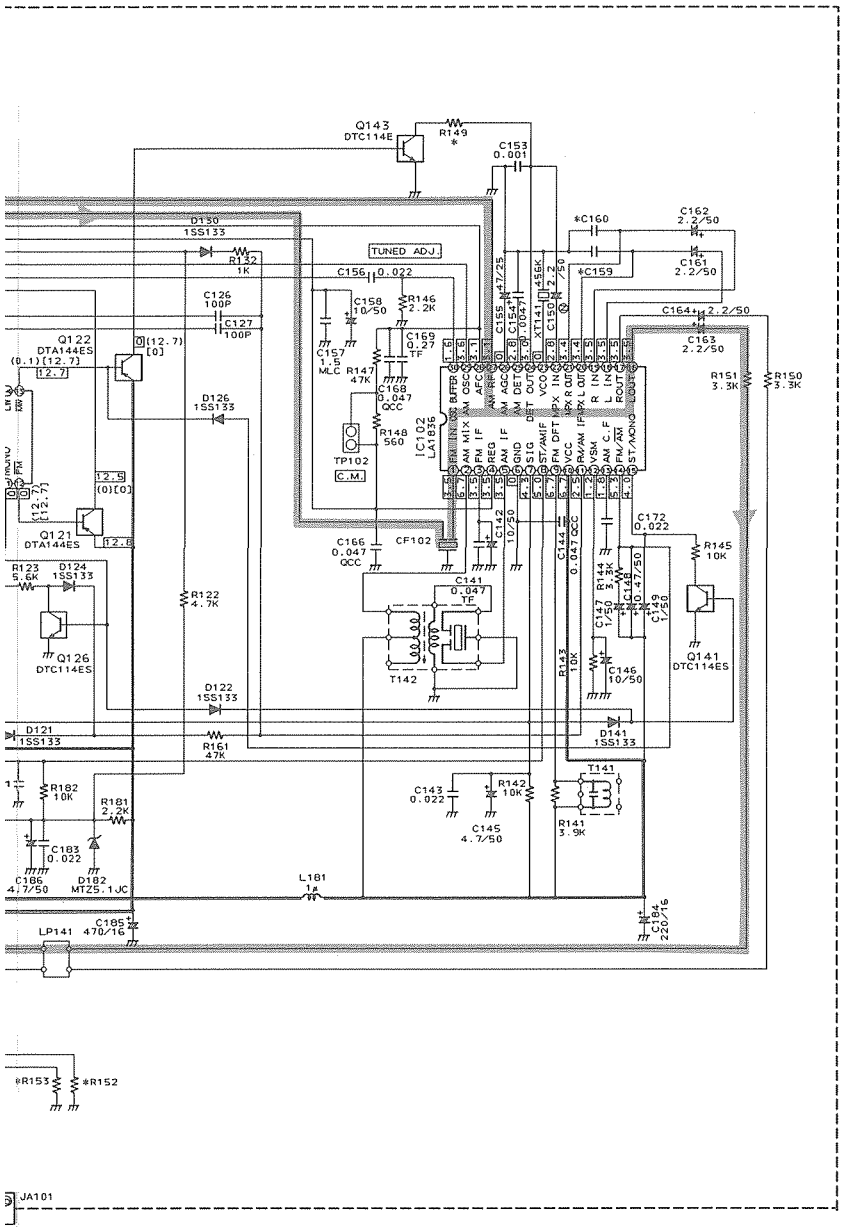
J K L M N O P Q R S



(4) Tuner Section (For U, UT, A)



J K L M N O P Q R S



* MARK

	U, UT	A
C159, 160	0.033TF	0.027TF
R149	22K	10K
R152, 153	3.3K	8.2K

FM AUTO NO SIGNAL
( )MW NO SIGNAL
[ ]LW NO SIGNAL