3.14 SIGNETICS NE652

3.14.1 General

The Signetics NE652 is a two-channel device, providing Dolby B-type noise reduction, both channels of which can be switched simultaneously to either encode or decode mode. (It may also be used to provide a single-channel Dolby C-type processor; this application is described in Section 13.4.) Dolby Level is 388 mV at the test point and at the output terminals, with a corresponding input sensitivity of about 388 mV as well. There is no provision for driving a multiplex or low-pass filter, which must be supplied externally. However, in some applications the filter will be already provided in the rest of the unit, as for example in the multiplex decoder of an FM tuner.

3.14.2 Class of integrated circuit processor

The following classes of processor may be built using the Signetics NE652 integrated circuit.

Class I — Switchable processor with multiplex filter, circuit A1C 2678 on page 3.14.9. For use in cassette recorders and certain integrated products where a processor is required to operate either in the encode or the decode mode. Note that the source impedance of the circuit connected to the input terminals 2 and 8 must be less than 50 ohms.

Class II — By hard wiring the switching shown in AIC 2678 into the encode mode, an encode-only processor for three-head decks can be produced. The same restriction of source impedance applies.

Class III and IV — Similarly, by hard wiring the switching shown in AIC 2678 into the decode mode, a decode-only processor with input filter can be produced. It is important that a buffer amplifier is used to isolate the filter from the input to the integrated circuit since the input impedance is only 10 K ohm and subject to a wide tolerance; therefore, it cannot be used as part of an accurate filter termination.

Class V — Decode processor without filter, circuit A1C 2679 on page 3.14.10. For use in products where there is no danger of spurious high frequency signals interfering with the processing, e. g. in playback-only tape decks.

All processors require level matching to the equipment in which they are used (see details in sections 4 to 6). No further adjustment is necessary.

3.14.3 Power supply

The Signetics NE652 will operate on supplies in the range of 8 to 20 volts; the output overload level increases with increase in supply voltage. A supply should be chosen to give an overload margin of at least 12 dB above Dolby Level.

Current drain is essentially constant between no-signal and full-signal conditions; however, rapid changes in the supply voltage will appear on the outputs as thumps, so it is good design to use either a regulated supply or one with a long time constant.

The NE652 can also be powered by split power supplies. In this mode, all points marked V_{ref} on the circuit diagram should be connected to ground, and all points marked thus ⏚ should be connected to the negative supply. Capacitor C202, bypassing the reference voltage in the single-ended supply condition, is not required for split power supplies.

3.14.4 NR Switching

Electronic switching is provided to turn the noise reduction on and off. Several logic levels are provided since the NE652 can function as two B-type devices, or one switchable C-type/B-type device. As shown in the data sheets, the switching thresholds at pin 14 are different for two-channel Dolby B-type operation than for the Dolby C-type application. For two-channel use, grounding pin 14 turns noise reduction off and connecting it to V_{ref} (or $0.5\ V_{cc} \pm 0.1\ V_{cc}$) switches the device into the two-channel B-type NR mode. (For details of C-type switching levels, see Section 13.4.)

DOLBY NOISE REDUCTION CIRCUIT

NE652

Preliminary

DESCRIPTION

The NE652 is a monolithic bipolar IC designed for use in Dolby* B Type and Dolby C Type NR systems. The NE652 can be used as a dual channel circuit for Dolby B NR systems or for one channel of a Dolby C NR system. When used with the NE654 switching IC, a complete Dolby* B-C NR system including record and playback pre-amps can be realized.

FEATURES

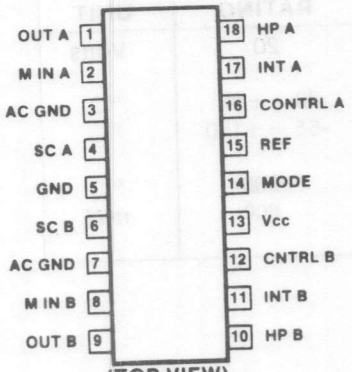
- **Dual processors provide optimum high-low level stage matching in Dolby C Type NR systems and optimum channel matching in Dolby B Type NR systems.**
- **Full wave rectifier**
- **No capacitive divider required for sidechain filter**
- **Electronic switching for NR on/off.**
- **Reference level 0dB = -6dBm (387.5 mV) offers line output level level option of 0 dBm (775 mV)**
- **Easy use in 2 or 3 head systems**
- **Split supply operation is optional**

APPLICATIONS

- **Dolby B or Dolby B-C Type NR systems for:**
  - **— Home cassette decks**
  - **— Automotive cassette players**
  - **— Portable cassette players**
  - **— Video cassette recorders**
  - **— Video disc players**
  - **— FM receivers**

PIN CONFIGURATIONS

DOLBY* B TYPE SYSTEMS

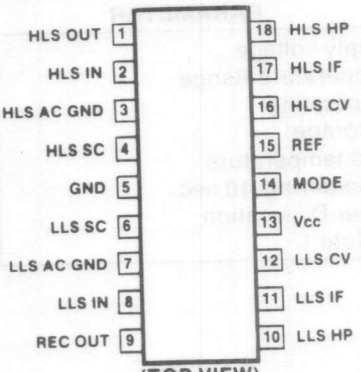


(TOP VIEW)

ORDER NUMBER
NE652

1. Output channel A
2. Main chain input channel A
3. AC ground (channel A)
4. Side chain (channel A)
5. Ground
6. Side chain (channel B)
7. AC ground (channel B)
8. Main chain input (channel B)
9. Output channel B
10. High pass filter channel B
11. Integrating filter channel B
12. Control voltage channel B
13. V_{CC}
14. Mode
15. Ref
16. Control voltage channel A
17. Integrating filter channel A
18. High pass filter channel A

DOLBY* B-C TYPE SYSTEMS



(TOP VIEW)

ORDER NUMBER
NE652

1. High level stage output
2. High level stage input
3. AC ground high level stage
4. High level stage side chain
5. Ground
6. Low level stage side chain
7. AC ground low level stage
8. Low level stage in
9. Record output
10. Low level stage high pass filter
11. Low level stage integrating filter
12. Low level stage control voltage
13. V_{CC}
14. Mode B/C/NR off switch input
15. Reference voltage
16. High level stage control voltage
17. High level stage integrating filter
18. High level stage high pass filter

*Dolby is a registered trademark of Dolby Laboratories Licensing Corporation, San Francisco, Calif.

DOLBY NOISE REDUCTION CIRCUIT

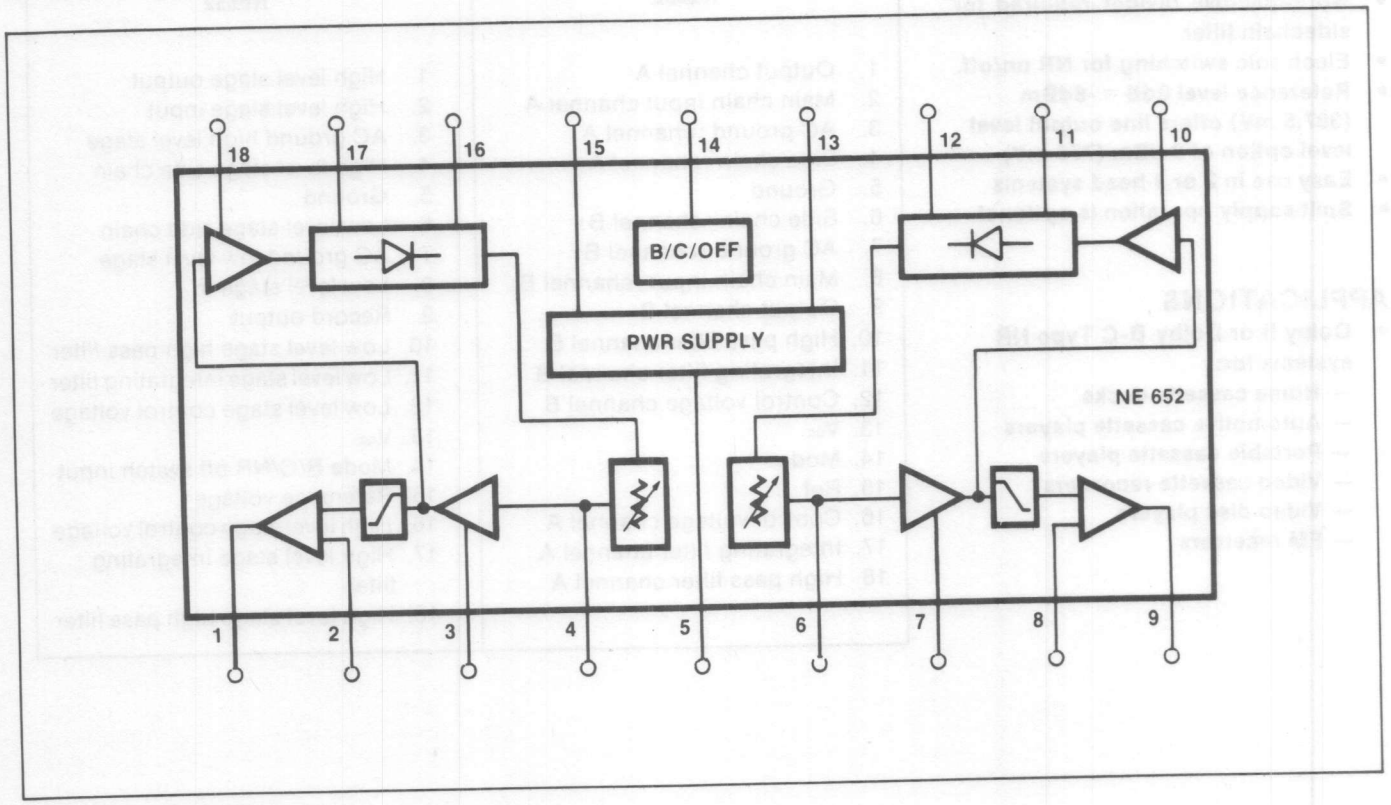
NE652

Preliminary

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage	20	Volts
Temperature Range		
Operating	-30 → +85	°C
Storage	-55 → +150	°C
Lead temperature (Soldering, 10 sec)	+300	°C
Power Dissipation (Note 1)	600	mW

BLOCK DIAGRAM



DOLBY NOISE REDUCTION CIRCUIT

NE652

Preliminary

ELECTRICAL CHARACTERISTICS

STANDARD CONDITIONS: V_{CC} = 14 volts; f = 20Hz to 15kHz; T_A = 25° C. All levels referenced to 387.5 mV = 0dB = -6dBm at test point 1, test circuit Fig. 1, record mode unless otherwise specified.

SYMBOL & PARAMETER	MODE	f(Hz)	TEST CONDITIONS	NE652 MIN	NE652 TYP	NE652 MAX	UNIT
V_{CC} Supply voltage range	B			8	14	20	Volts
I_{CC} Supply current	Off		No Input Signal		17	25	mA
Voltage gain	Off	1K	20 Log $\frac{V \text{ pin } 1\ (9)}{V \text{ pin } 2\ (8)}$	-.5	0	+.5	dB
Signal handling at Record Output	B/C	1k	V_{CC} = 14V; 1% THD		20		dB
	B/C	1k	V_{CC} = 8V; 1% THD, Note 1	12	14		dB
	B	1k	V_{CC} = 6V; 1% THD		11		dB
THD Distortion	C	1k	0dB		.1	.3	%
	C	1k	+10dB		.15	.5	%
THD Distortion	B	10k	0dB		.05	.1	%
	B	10k	+10dB		.05	.3	%
S/N Signal to Noise Ratio	B		R_S = 10K (Internal) CCIR/ARM weighted at pin 9	77	80		dB
B-Mode Frequency Response	B	2k	Test point level = -25dB	-19.5	-18	-16.5	dB
	B	5k	Test point level = -40dB	-30.2	-29.7	-28.2	dB
	B	10k	Test point level = -30dB	-25	-23.5	-22.0	dB
C-Mode Frequency Response	C	200	Test point level = -40dB	-33.4	-31.9	-30.4	dB
	C	500	Test point level = -30dB	-20.2	-18.2	-16.2	dB
	C	1k	Test point level = -20dB	-16.1	-14.1	-12.1	dB
	C	1k	Test point level = -30dB,	-20.1	-18.6	-17.1	dB
	C	1k	Test point level = -40dB,	-25.8	-23.8	-21.8	dB
	C	5k	Test point level = 0dB,	-3.8	-2.3	-0.8	dB
	C	5k	Test point level = -20dB,	-19.1	-17.1	-15.1	dB
	C	5k	Test point level = -30dB,	-23.6	-21.6	-19.6	dB
	C	5k	Test point level = -40dB	-28.5	-26.5	-24.5	dB
Switching thresholds (Dolby C-Type NR)	Off		Voltage at Pin 14			.065V_{CC}	Volts
	B		Voltage at Pin 14	.2V_{CC}	.25V_{CC}	.3V_{CC}	Volts
	C		Voltage at Pin 14	.85V_{CC}			Volts
Switching thresholds (dual chan. Dolby B NR)	B		Voltage at Pin 14, Fig. 2	.4Vcc	.5Vcc	.6Vcc	
Frequency response shift versus temperature	C		Temp. range -40° C to +85° C measured as deviation from 25° C		±.5		dB
Frequency response shift versus supply voltage	C		Voltage range 8 to 20V. measured as deviation from 14V.		±.5		dB

NOTE:

DOLBY NOISE REDUCTION CIRCUIT

NE652

Preliminary

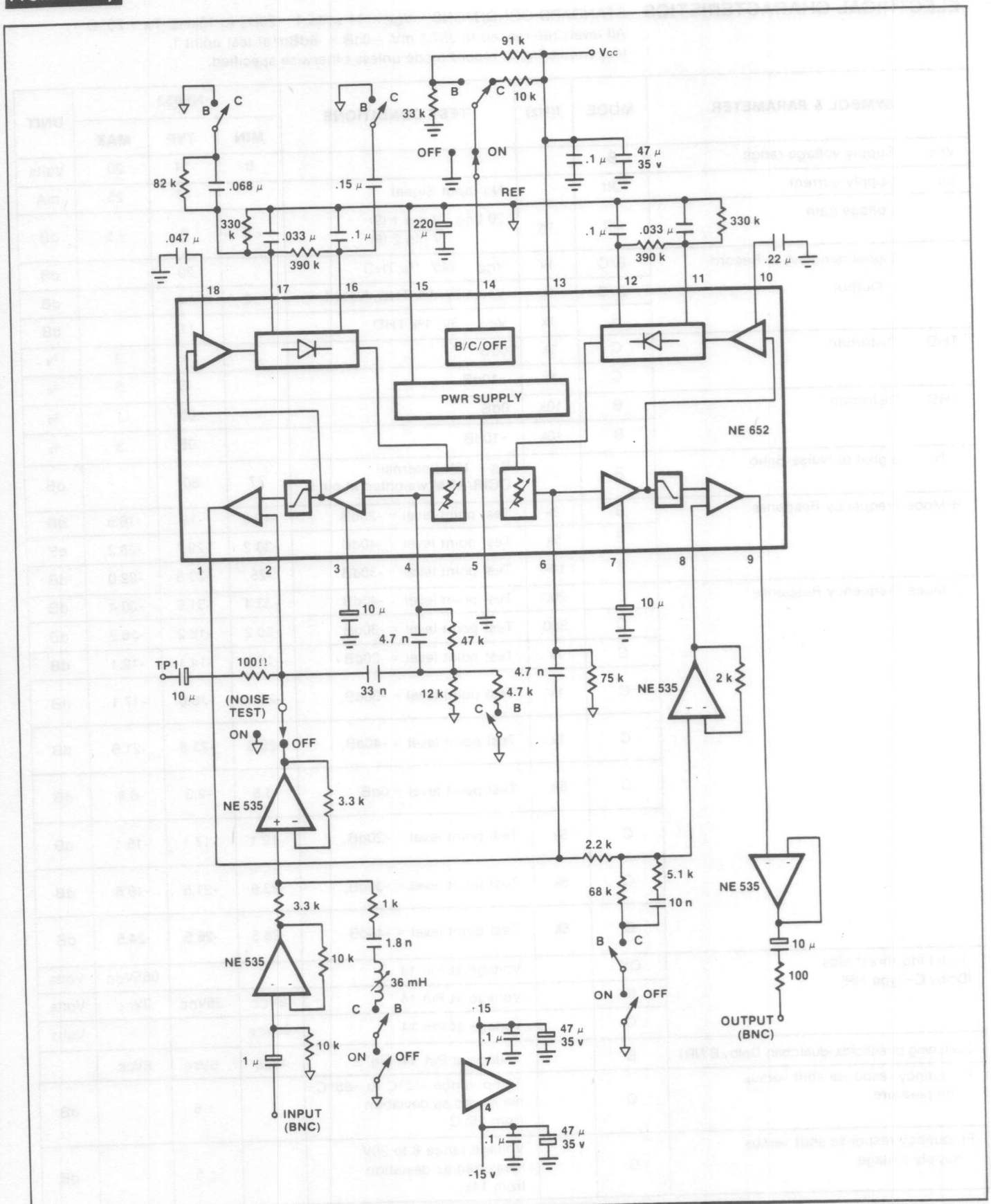


Figure 1. Test circuit for 652, Encode mode.

DOLBY NOISE REDUCTION CIRCUIT

NE652

Preliminary

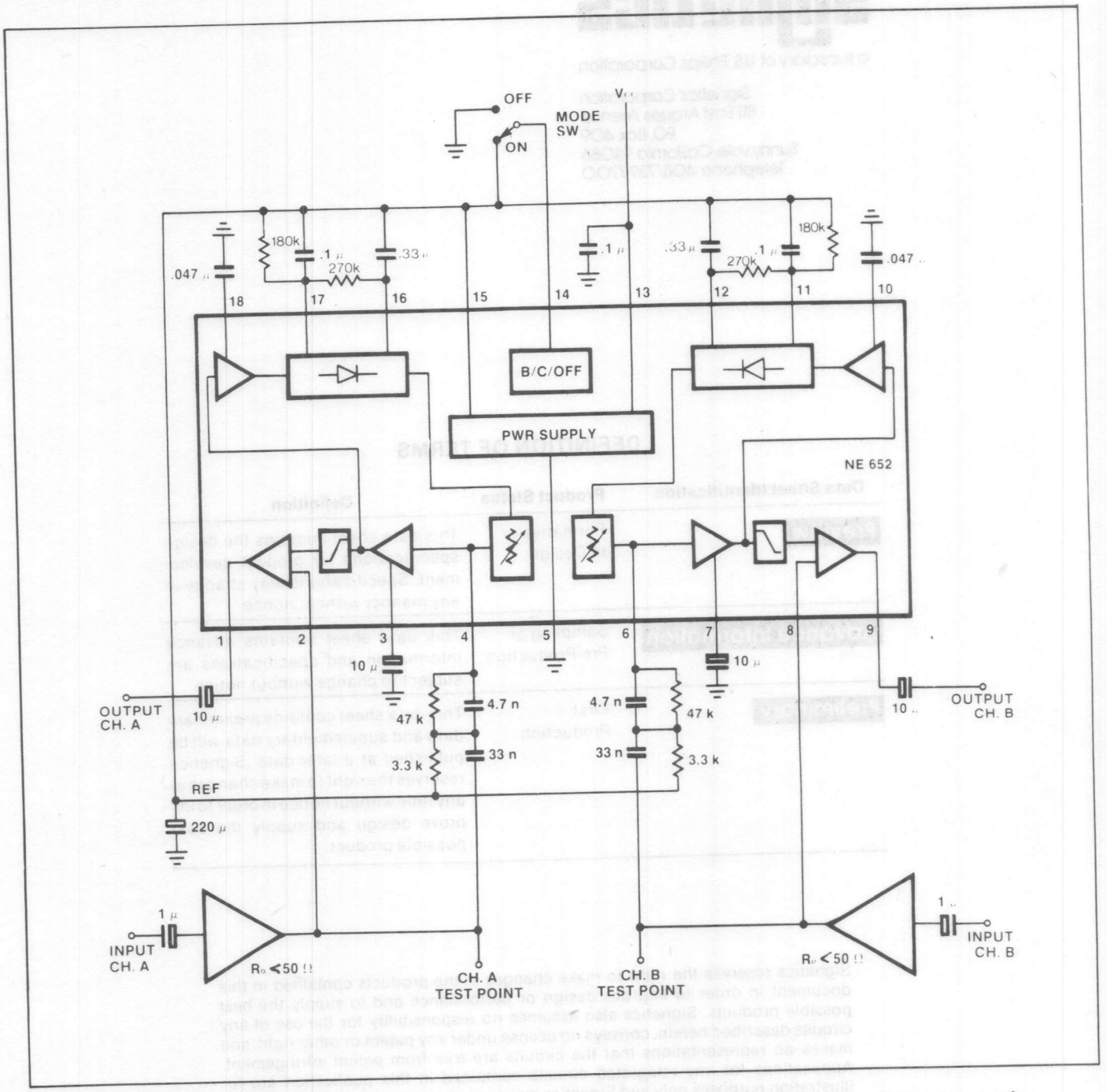


Figure 2. Typical application circuit for Dolby B Noise Reduction shown in Encode mode.

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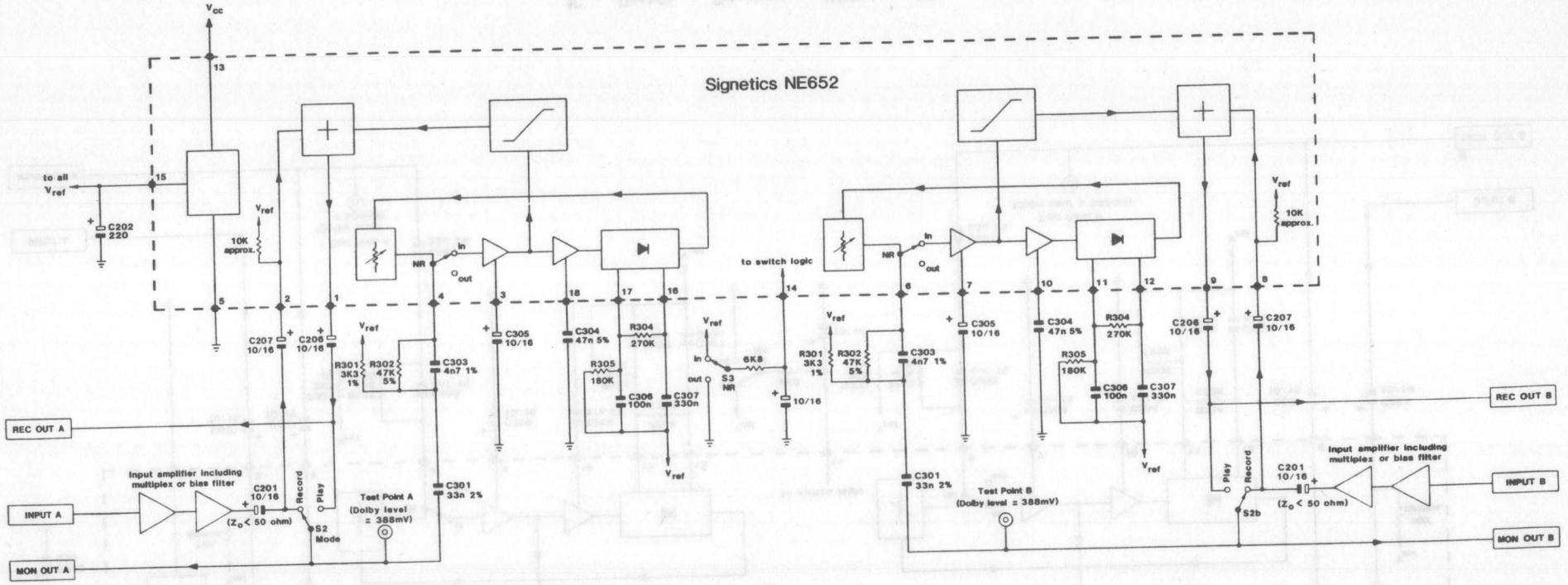
DEFINITION OF TERMS

Data Sheet Identification	Product Status	Definition
Preview	Formative or In Design	This data sheet contains the design specifications for product development. Specifications may change in any manner without notice.
Advance Information	Sampling or Pre-Production	This data sheet contains advance information and specifications are subject to change without notice.
Preliminary	First Production	This data sheet contains preliminary data and supplementary data will be published at a later date. Signetics reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

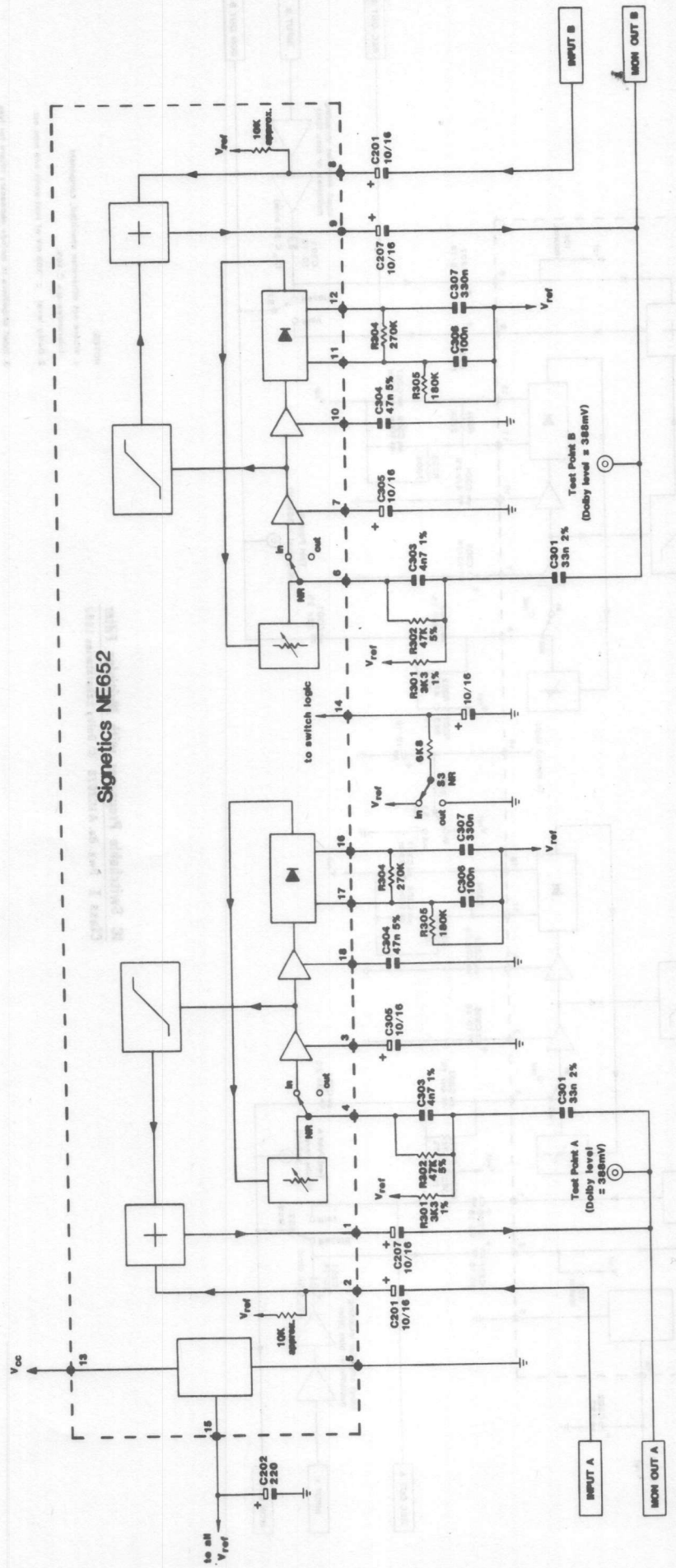


IC Switchable Processor with Multiplex Filter

Class I Dwg. No. A1C2678 © Dolby Laboratories 1982

NOTES:

1. Where not otherwise specified, component tolerances are ± 10%.
2. Dolby level = 388 mV at test point and mon out.
3. Input amplifiers to include necessary filters for bias and/or multiplex interference.



IC Decode Processor Without Filter

Class V Dwg. No. A1C2679 © Dolby Laboratories 1982

NOTES:

1. Where not otherwise specified, component tolerances are ± 10%.
2. Dolby level = 388 mV at test point and mon out.
   = 388 mV approx at input.

13.4 SIGNETICS NE652/NE654

13.4.1 General

The Signetics NE652 can be used as a single-channel Dolby C-type processor; together with the NE654 switching integrated circuit it provides all the amplifiers necessary to provide a C-type and B-type switchable processor. DC voltages are used to switch modes, noise reduction, and input signals thus considerably easing the design of a complete product. Provision is also made for driving a standard multiplex filter.

Data sheets for the NE652/NE654 combination are included in this section beginning on page 13.4.5; a data sheet for the NE652 used on a B-type processor is contained in Section 3.14; and a data sheet for the NE654 alone can be obtained from Signetics Corporation.

13.4.2 Classes of Circuits

Processors may be built for record (encode), playback (decode), or switchable applications; the circuit diagram shown in fig. 13.4.1 following the data sheet is the "master" circuit which can be adapted to most applications. The basic processors (Class I to Class V) for C-type circuits are similar to those shown for B-type circuits in Volume 1 of the Licensee Information Manual. In particular, figs. 4.5.1 to 4.5.7 are applicable in concept and can be used as the basis for designs. Figs. 12.15.1 and 12.15.2 show in two instances how these basic concepts can be applied to C-type circuits.

13.4.3 Power Supply

The Signetics NE652/NE654 pair will operate on supplies in the range of 8 to 20 volts; the output overload level increases with increase in supply voltage. A supply should be chosen to give an overload margin of at least 12 dB above Dolby Level. For a line output level of 775 mV, this gives a minimum supply of about 11 volts. Higher output levels obviously need higher supplies (see paragraph 13.4.5).

Current drain is essentially constant between no-signal and full-signal conditions; however, rapid changes in the supply voltage will appear on the outputs as thumps, so that it is good design to use either a regulated supply or one with a long time constant.

The NE652/654 devices can also be powered by split power supplies. In this mode, all points marked V_{ref} on the circuit diagram should be connected to ground, and all points marked thus $\doteq$ should be connected to the negative supply. Capacitor C4, bypassing the reference voltage in the single-ended supply condition, is not required for split power supplies. (Resistors R10 and R11 at the outputs are used to reference the output to ground, and should remain connected to ground for all conditions; their function may be supplied by following amplifier stages, in which case they are redundant.)

13.4.4 Switching

Electronic switching is provided for both the noise reduction mode and record/play functions. To provide slow controlled changeovers between modes, optional time constants (R20/C20 and R21/C21) can be used. The value of R20 should be 6.8 K divided by the number of processors being switched.

The NE652 can also be programmed to provide two B-type processors (described in Section 3.14); it is important that, if the NE654 is not used to provide the various switching and control functions, the correct voltages are applied to pin 14 of the NE652. For NR off, pin 14 is grounded, and for C-type, it is connected to the supply voltage V_{cc}. For use as a switchable B/C-type processor (where only one processor is used in the B-type mode), pin 14 is connected to $\frac{1}{4}V_{cc}$; this voltage is normally provided internally by the NE654. In contrast, for two independent B-type circuits, pin 14 is connected to $\frac{1}{2}V_{cc}$.

13.4.5 Line Output Level

The circuit shown in fig. 13.4.1 and in the data sheet gives a line output level of 0.775 V (0 dB). Resistors R101 and R102 allow this level to be changed. Note that the parallel combination of R101 and R102 must be 3.3 k ohm, 2%; the gain above 387.5 mV (-6 dB) is given by the expression (1 + R102/R101). The basic recording input sensitivity of about 50 mV for 0 dB output will decrease following the same rule; a larger output will require a larger input. The playback input sensitivity will not change. (This is because the programmable amplifier, which incorporates the spectral skewing network, is at the input of the recording processor but at the output of the playback processor. In the recording processor, the voltage at the output of the spectral skewing network is equal to the voltage at the test point, which is always 387.5 mV. Thus changes in the gain of the programmable amplifier directly affect the recording input sensitivity.)

However, for best signal to noise ratios, it is important to keep the input sensitivity constant when output levels are changed. An easy method of achieving this is to split R4 into two parts, keeping the sum equal to the value required for correct termination of the multiplex filter block, and using the ratio between the two parts to achieve constant input sensitivity.

If a standard spectral skewing filter block is used (as shown on the circuit diagram), then an increase in output level from 387.5 mV to 0.775 mV can be made simply by connecting pin b to pin a rather than to V_{ref}.

Note, as the output level is increased, the overload margin is proportionately decreased. Output levels and power supply voltages must be chosen together so that a 12 dB overload margin is achieved at all times.

13.4.6 Multiplex Filter

Certain classes of processors require a multiplex or bias rejection filter. The NE654 has provision to drive such a filter, as shown in fig. 13.4.1. The source resistance at pin 2 is low, and the input impedance at pin 3 is high; thus R3 and R4 should be chosen for the value of source and termination resistance appropriate to the particular filter used.

13.4.7 Independent Use of NE652

It is possible to use the NE652 without the special switching NE654 integrated circuit. It is inconvenient (and probably uneconomic) not to use the NE654 for all applications except for a dedicated non-switchable C-type only processor, where there is possibly a small cost (though not necessarily manufacturing) advantage. However, if this is done, it is essential to provide buffer amplifiers around the spectral skewing and anti-saturation networks, since the input impedances on pins 2 and 8 are low enough to load these circuits and, in consequence, cause errors.

DOLBY NOISE REDUCTION SYSTEM

NE652/654

Preliminary

DESCRIPTION

The NE652 and NE654 are monolithic bipolar integrated circuits designed for use in Dolby* C-Type Noise Reduction (NR) systems. The NE652, 18 pin DIP, performs the signal processing functions required in either Dolby* B Type or Dolby* C Type NR systems. The NE652 contains two matched processors which can be used in Dolby* B Type applications as a dual channel device or provide the high and low level stages for one channel of a Dolby* C Type NR system, including NR on/off switching. The NE654, 24 pin DIP, when used with the NE652, provides all electronic switching necessary for Dolby* C-Type systems. In addition, the NE654 includes preamplifiers for the record and playback functions and a multiplex filter buffer amp.

FEATURES

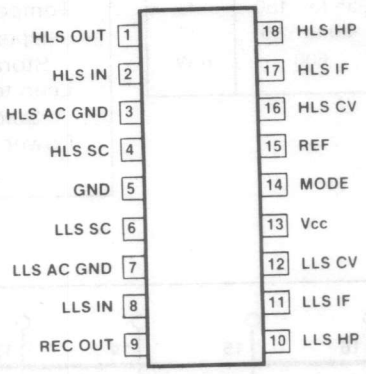
- **Dual processor for excellent matching of high and low level stages**
- **Full wave rectification**
- **No capactive divider for sidechain filter**
- **All electronic switching**
- **Only one network required for spectral skewing/deskewing**
- **Only one network required for anti-saturation**
- **On board rec/play preamps plus multiplex filter buffer amp**
- **Externally set line output level**

APPLICATIONS

- **Dolby* B-C Type NR System for:**
  - **— Home decks**
  - **— Automotive decks**
  - **— Portable cassette players**
  - **— Video cassette systems**
  - **— Video disc players**
  - **— FM receivers**

PIN DESCRIPTION

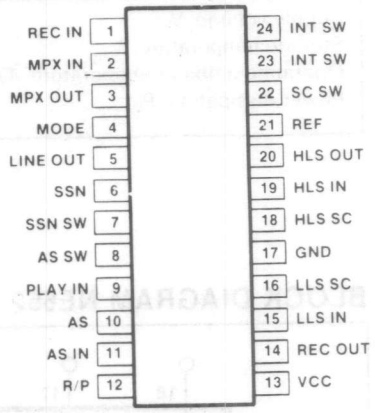
DOLBY* B-C TYPE SYSTEMS



(TOP VIEW)

ORDER NUMBER
NE652

N PACKAGE



(TOP VIEW)

ORDER NUMBER
NE654

NE652 PIN DESIGNATION

1. High level stage output
2. High level stage input
3. AC ground high level stage
4. High level stage side chain
5. Ground
6. Low level stage side chain
7. AC ground low level stage
8. Low level stage in
9. Record output
10. Low level stage high pass filter
11. Low level stage integrating filter
12. Low level stage control voltage
13. V_{CC}
14. Mode B/C/NR off switch input
15. Reference voltage
16. High level stage control voltage
17. High level stage integrating filter
18. High level stage high pass filter

NE654 PIN DESIGNATION

1. Record input
2. MPX-filter input
3. MPX-filter output
4. Mode B/C/NR OFF switch input
5. Line output
6. Spectral skewing network
7. Spectral skewing network switch
8. Anti-saturation filter switch
9. Playback input
10. Anti-saturation filter
11. Anti-saturation filter input
12. Record/playback switch input
13. V_{CC}
14. Record output
15. Low level stage main chain input
16. Low level stage side chain input
17. Ground
18. High level stage side chain input
19. High level stage main chain input
20. High level stage output
21. Reference voltage
22. Side chain filter switch
23. Integrating filter switch
24. Integrating filter switch

*Dolby is a registered trademark of Dolby Laboratories Licensing Corporation, San Francisco, Calif.

DOLBY NOISE REDUCTION SYSTEM

NE652/654

Preliminary

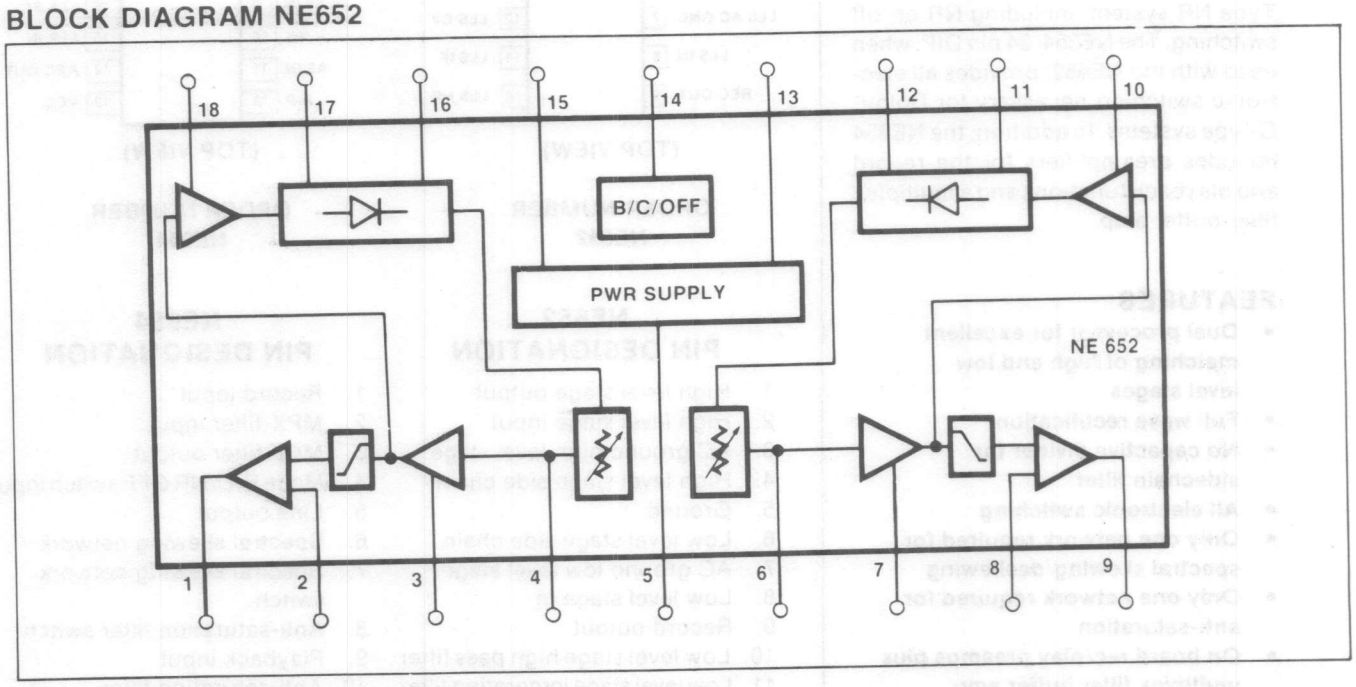
ABSOLUTE MAXIMUM RATINGS NE654

SYMBOL & PARAMETER	RATING	UNIT
Supply voltage, V_{CC}	20	V
Storage temperature, T_{Stg}	-55 to +150	°C
Operating ambient temperature, T_A	-30 to +85	°C
Power dissipation, P_V	600	mW

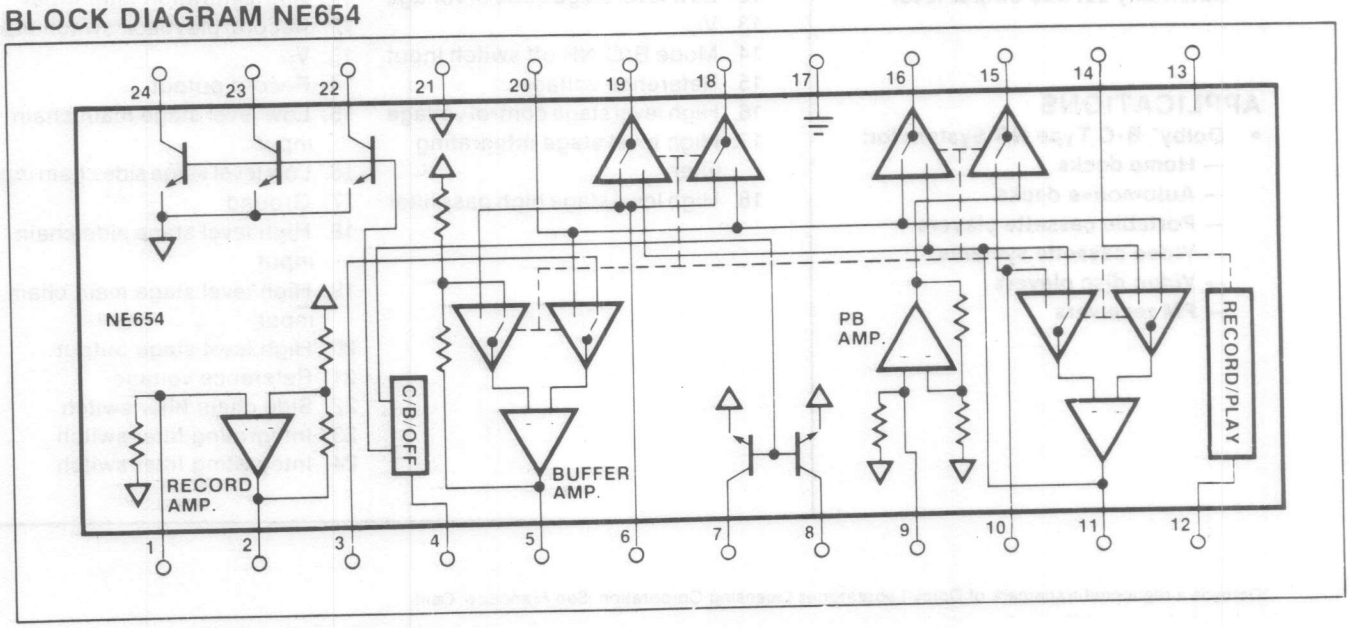
ABSOLUTE MAXIMUM RATINGS NE652

PARAMETER	RATING	UNIT
Supply voltage	20	Volt
Temperature Range		
Operating	-30 ... +85	°C
Storage	-55 ... +150	°C
Lead temperature		
Soldering, 10 sec	+300	°C
Power Dissipation	600	mW

BLOCK DIAGRAM NE652



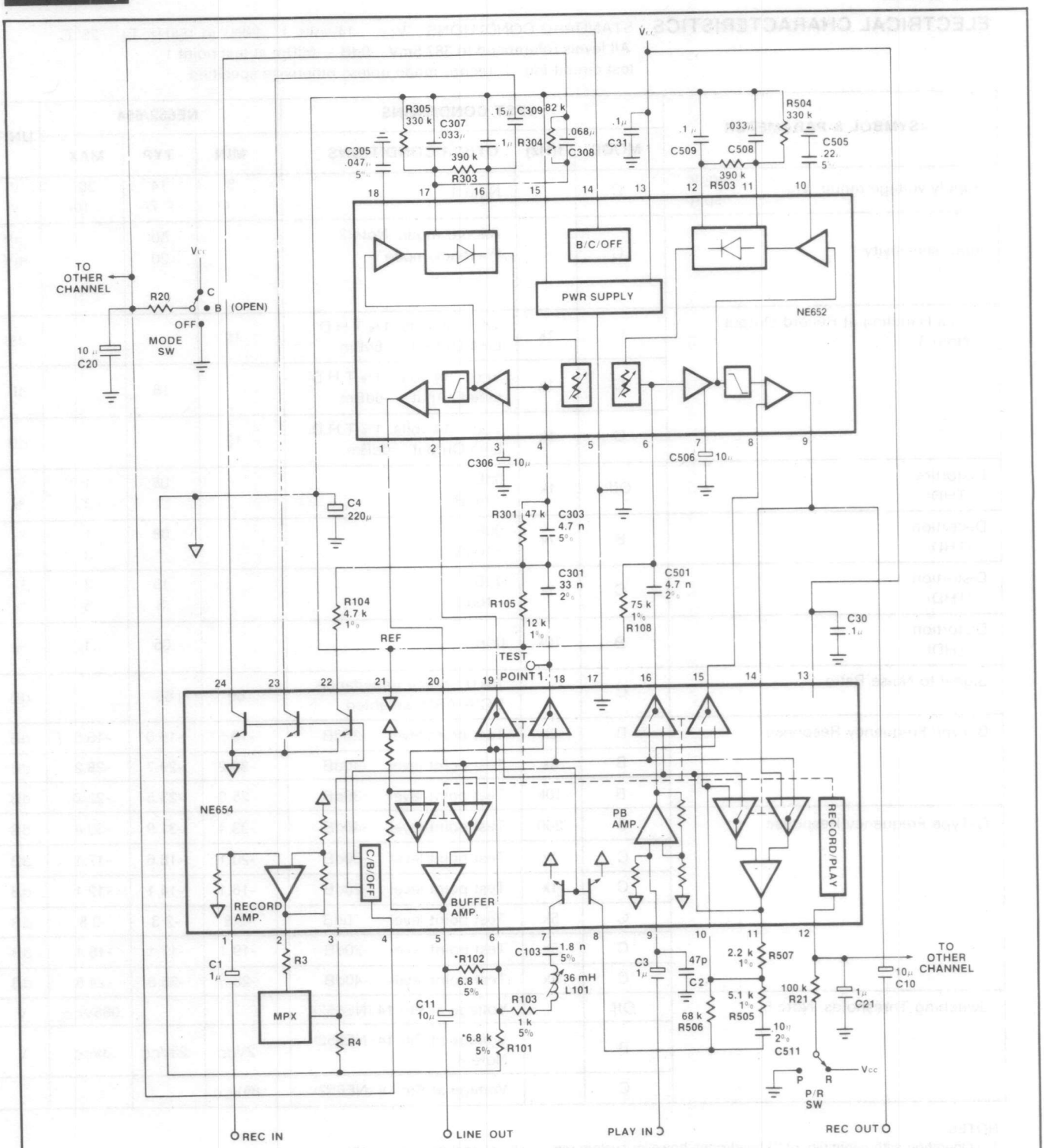
BLOCK DIAGRAM NE654



DOLBY NOISE REDUCTION SYSTEM

NE652/654

Preliminary



NOTES:

1. *Line output programming resistors.
2. Split supply operation and coupling capacitors are optional.
3. Time constant for mode switch is optional.
4. Applications info is for reference only. Final design configuration/values are found in relevant Dolby Labs Bulletins and Licensee manuals.
5. R20 value is equal to 6.8kΩ divided by "N" where "N" equals the number of switched channels.

Figure 1. Dolby B-C Noise Reduction System. Switches shown in REC position.

DOLBY NOISE REDUCTION SYSTEM

NE652/654

Preliminary

ELECTRICAL CHARACTERISTICS

STANDARD CONDITIONS: V_{CC} 14 volts; f 20Hz to 15kHz; T_A 25° C.
All levels referenced to 387.5mV = 0dB = -6dBm at test point 1,
test circuit Fig. 1, record mode unless otherwise specified.

SYMBOL & PARAMETER	TEST CONDITIONS			NE652/654			UNIT
	MODE	f(Hz)	OTHER CONDITIONS	MIN	TYP	MAX	
Supply voltage range, V_{CC} single (split)	C		Note 1	8 (±4)	14 (±7)	20 (±10)	V V
Input sensitivity	C		Record mode Note 2 Playback mode		50 30		mV mV
Signal Handling at Record Output, Note 3	C	1k	V_{CC} 8 volts, 1% T.H.D. Line Output -6dBm	12			dB
	C	1k	V_{CC} 14 volts, 1% T.H.D. Line Output -6dBm		18		dB
	C	1k	V_{CC} 14 volts, 1% T.H.D. Line Output 0dBm	12			dB
Distortion (THD)	Off	1k	0dB +10dB		.05 .1	.1 .3	% %
Distortion (THD)	B	1k	0dB +10dB		.08 .1	.1 .3	% %
Distortion (THD)	C	1k	0dB +10dB		.15 .3	.3 .5	% %
Distortion (THD)	B	10k	0dB		.05	.1	%
Signal to Noise Ratio	C		10kΩ Source Impedance CCIR/ARM weighted	60	66		dB
B-Type Frequency Response	B	2k	Test point level = -25dB	-19.5	-18.0	-16.5	dB
	B	5k	Test point level = -40dB	-30.2	-29.7	-28.2	dB
	B	10k	Test point level = -30dB	-25.0	-23.5	-22.0	dB
C-Type Frequency Response	C	200	Test point level = -40dB	-33.4	-31.9	-30.4	dB
	C	1k	Test point level = -30dB	-20.1	-18.6	-17.1	dB
	C	1k	Test point level = -20dB	-16.1	-14.1	-12.1	dB
	C	5k	Test point level = 0dB	-3.8	-2.3	-0.8	dB
	C	5k	Test point level = -20dB	-19.1	-17.1	-15.1	dB
	C	5k	Test point level = -40dB	-28.5	-26.5	-24.5	dB
Switching Thresholds, Note 5	Off		Voltage at Pin 14 (NE652)			.065V_{CC}	V
	B		Voltage at Pin 14 (NE652) Note 4	.2V_{CC}	.25V_{CC}	.3V_{CC}	V
	C		Voltage at Pin 14 (NE652)	.85V_{CC}			

NOTES:

1. Operation with minimum 12dB headroom, however system remains functional down to 6 volts.
2. Attenuation between pin 2 and 3 of NE654 4dB.
3. System headroom is determined by programmable monitor output level (pin 5 of NE654).
4. In the open position (B) of the mode switch, pin 14 of NE652 is pulled to typically .25V_{CC} by NE654.
5. For a typical application see Fig. 10. Worst case considerations for the V_{CC} range (8-20 volts) limit the optional external resistor value. R20 value is equal to 6.8kΩ divided by "N" where "N" equals the number of switched channels.

DOLBY NOISE REDUCTION SYSTEM

NE652/654

Preliminary

PERFORMANCE CHARACTERISTICS

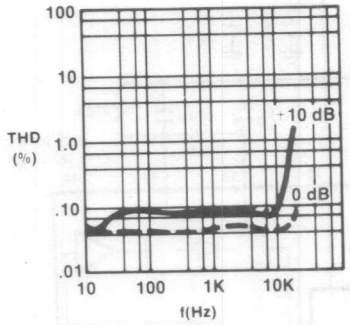


Fig 2. B-MODE THD

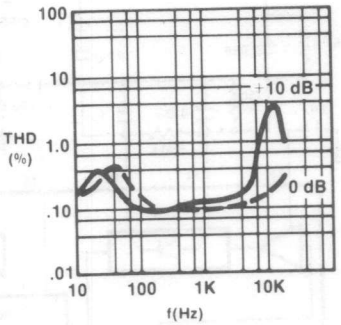


Fig 3. C-MODE THD

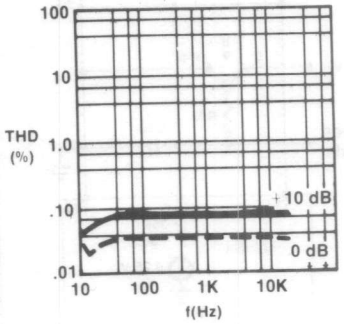


Fig 4. THD NR-OFF

652/654 SYSTEM

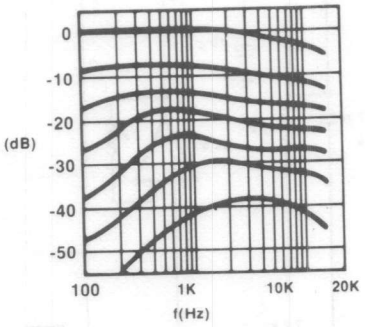


Fig 5. ENC. FREQ. RESPONSE C-MODE.

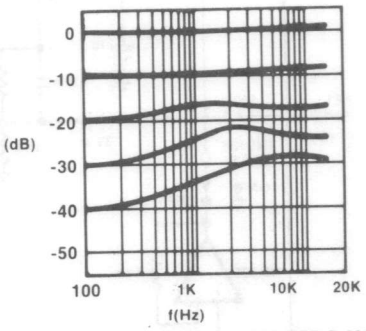


Fig 6. ENC. FREQ. RESPONSE B-MODE.

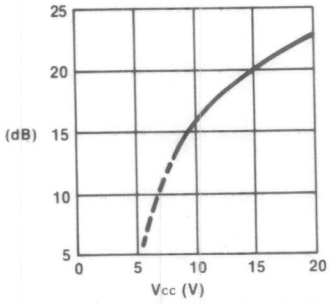


Fig 7. HEADROOM AT REC OUT.
LINE OUT AT -6 dBm.

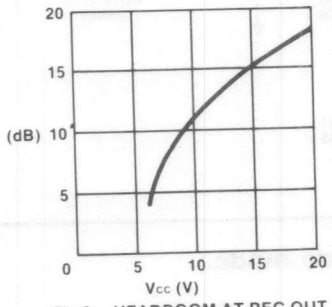


Fig 8. HEADROOM AT REC OUT.
LINE OUT AT 0 dBm.

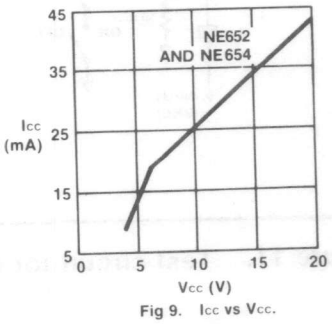


Fig 9. Icc vs Vcc.

DOLBY NOISE REDUCTION SYSTEM

NE652/654

Preliminary

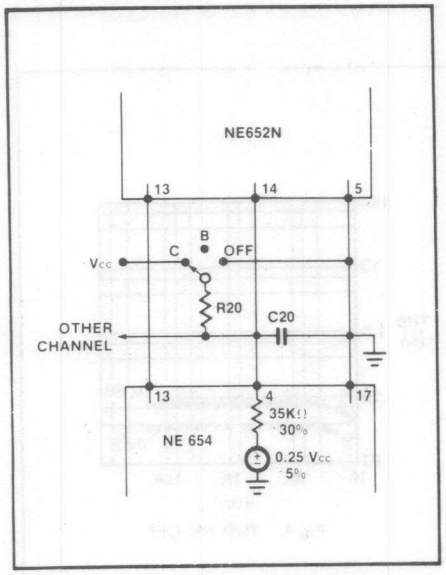


Figure 10. Optional external time constant for mode switch.

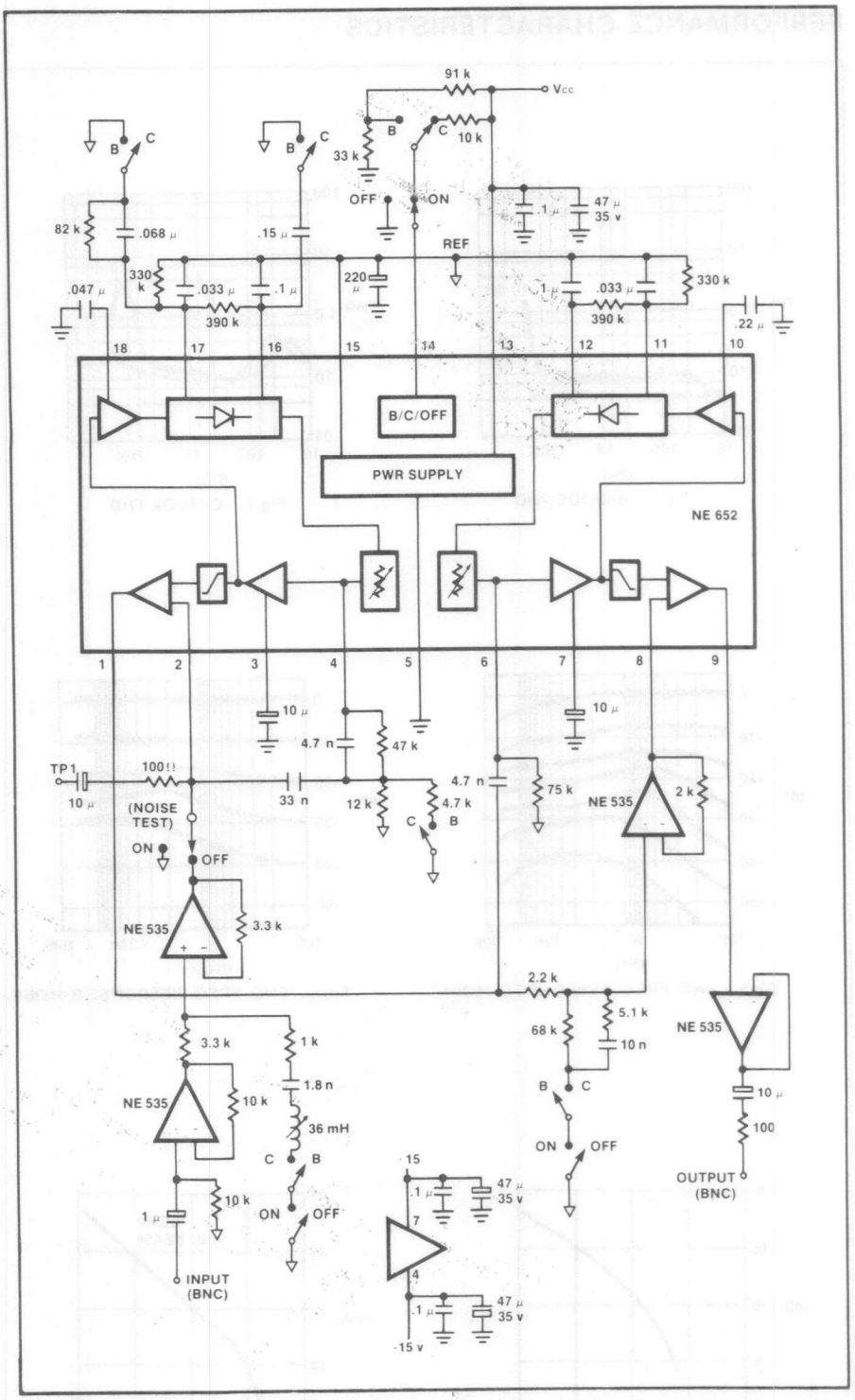
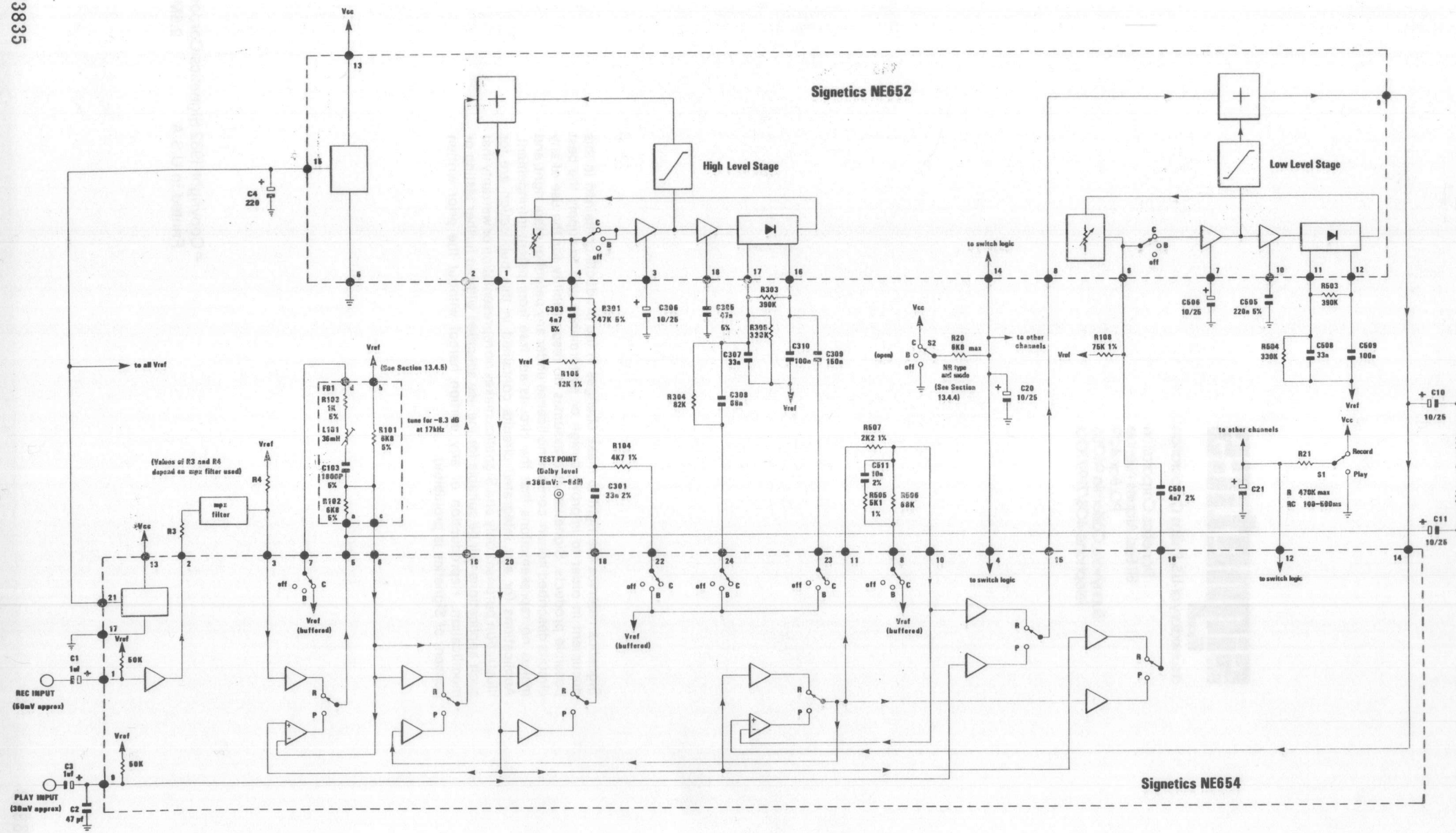
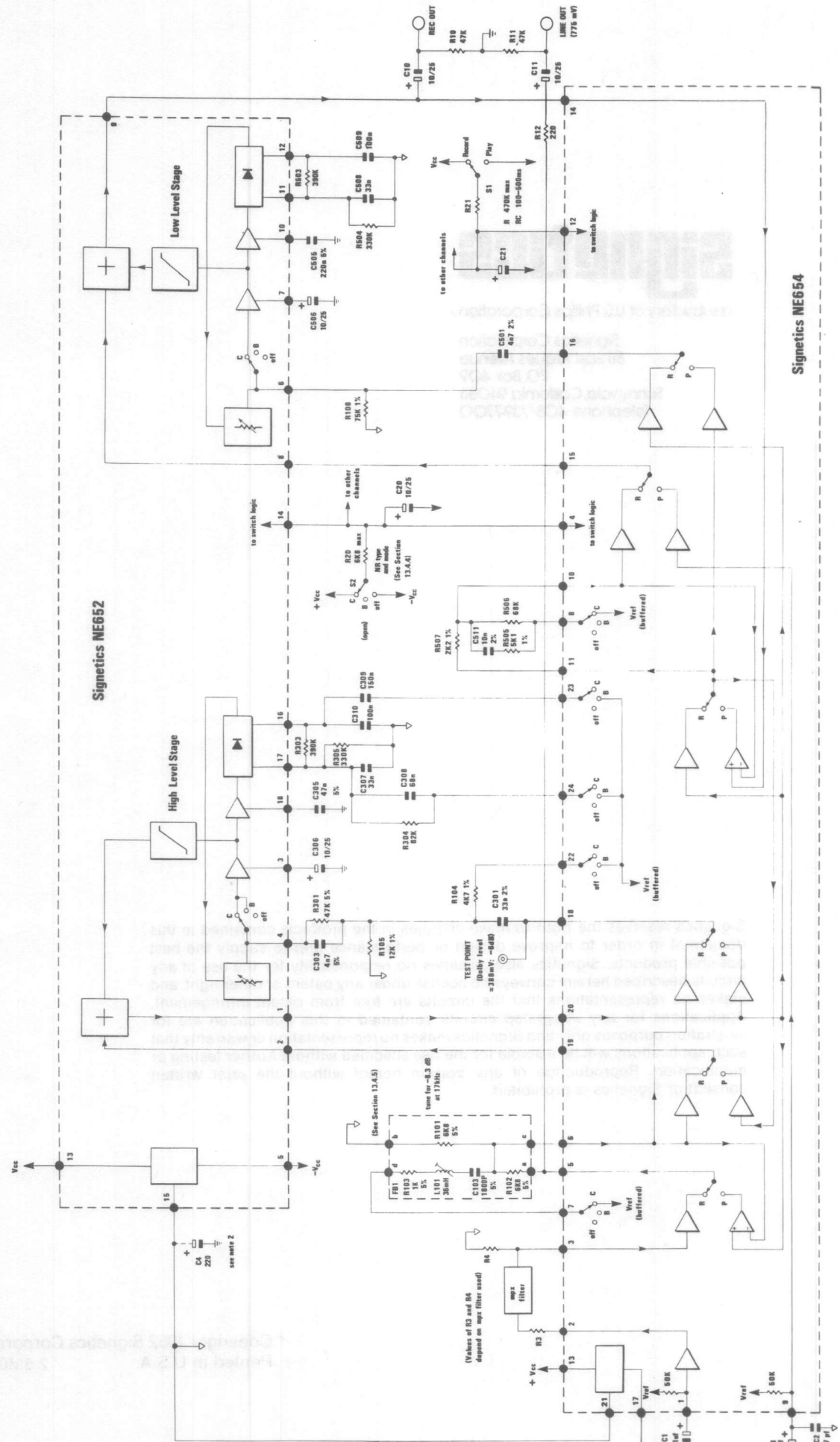


Figure 11. Test circuit for 652, Encode mode.

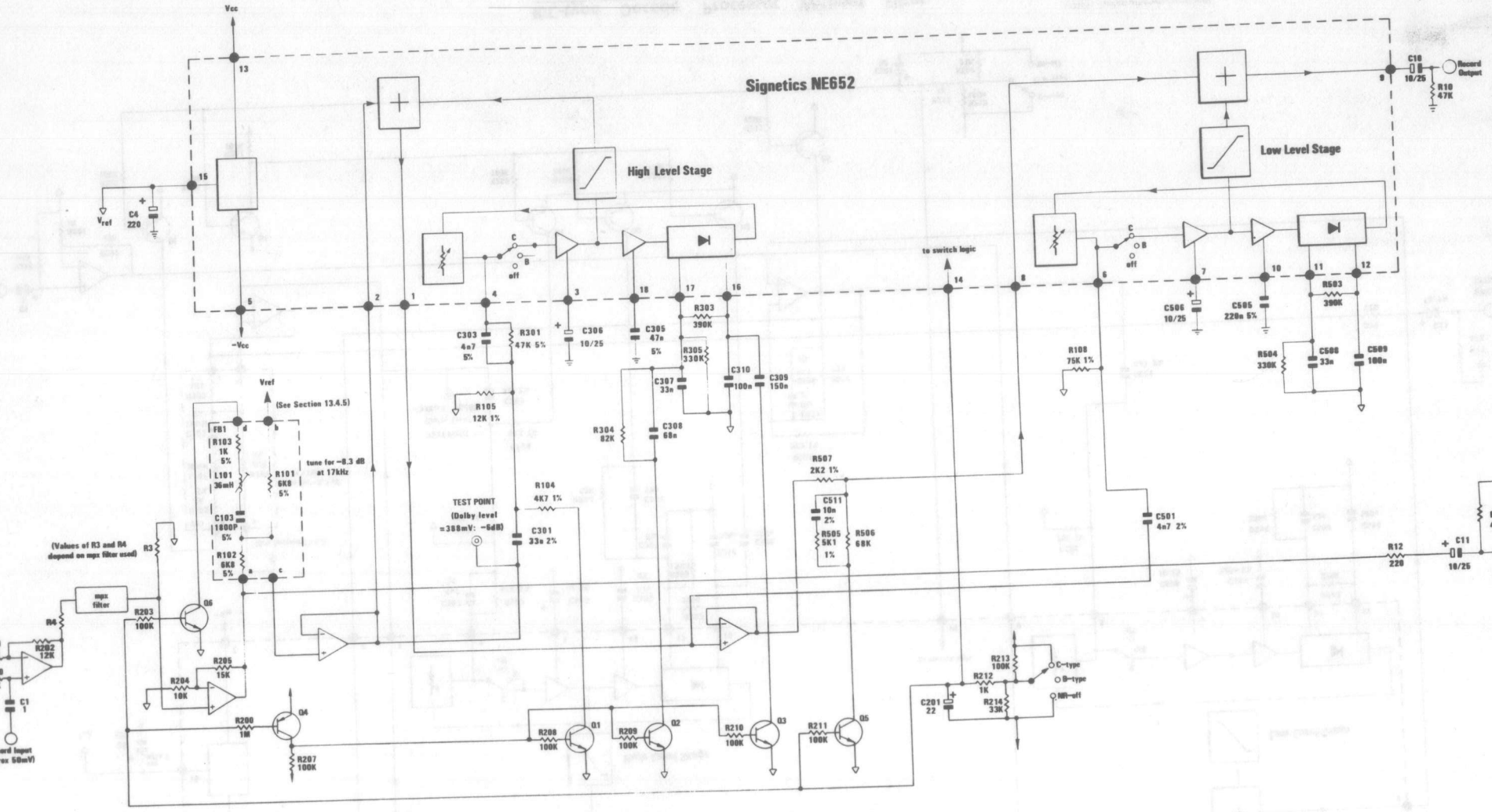
S82/3835


Signetics NE652
High Level Stage
Low Level Stage
Signetics NE654
Vcc
Vref
to all Vref
(See Section 13.4.5)
tune for −8.3 dB at 17kHz
(Values of R3 and R4 depend on mpx filter used)
mpx filter
TEST POINT
(Dolby level =388mV: −8dB)
to switch logic
to other channels
NR type and value
(See Section 13.4.4)
Record
Play
R 470K max
RC 100–500ms
REC INPUT
(50mV approx)
PLAY INPUT
(30mV approx)
Vref (buffered)
off
R303 390K
R395 332K
R104 4K7 1%
R105 12K 1%
R107 2K2 1%
R108 75K 1%
R20 6K8 max
R21
C303 4n7 5%
C306 10/25
C307 33n
C308 68n
C309 150n
C310 100n
C501 4n7 2%
C505 220n 5%
C506 10/25
C508 33n
C509 100n
C511 10n 2%
C20 10/25
C21
C10 10/25
C11 10/25
C1 1mf
C2 47 pf
C3 1mf
C4 220
R101 6K8 5%
R102 6K8 5%
R103 1K 5%
C103 1800P 5%
L101 36mH
FB1
R391 47K 5%
R304 82K
R505 5K1 1%
R506 68K
R503 390K
R504 330K
50K
S1
S2



NOTES: (Unless otherwise specified)

1. Component tolerances are ± 10%.
2. Circuit shown is for dual supply operation. For single supply, connect points marked + Vcc to positive supply and points marked -Vcc to ground. Points marked ⏚ must be connected to a true ground. For single supply operation, connect points marked ⏚ to Vcc/2 (half supply). For dual supply operation, connect points marked ⏚ and ⏚ to ground. C4 not needed for dual supply operation.



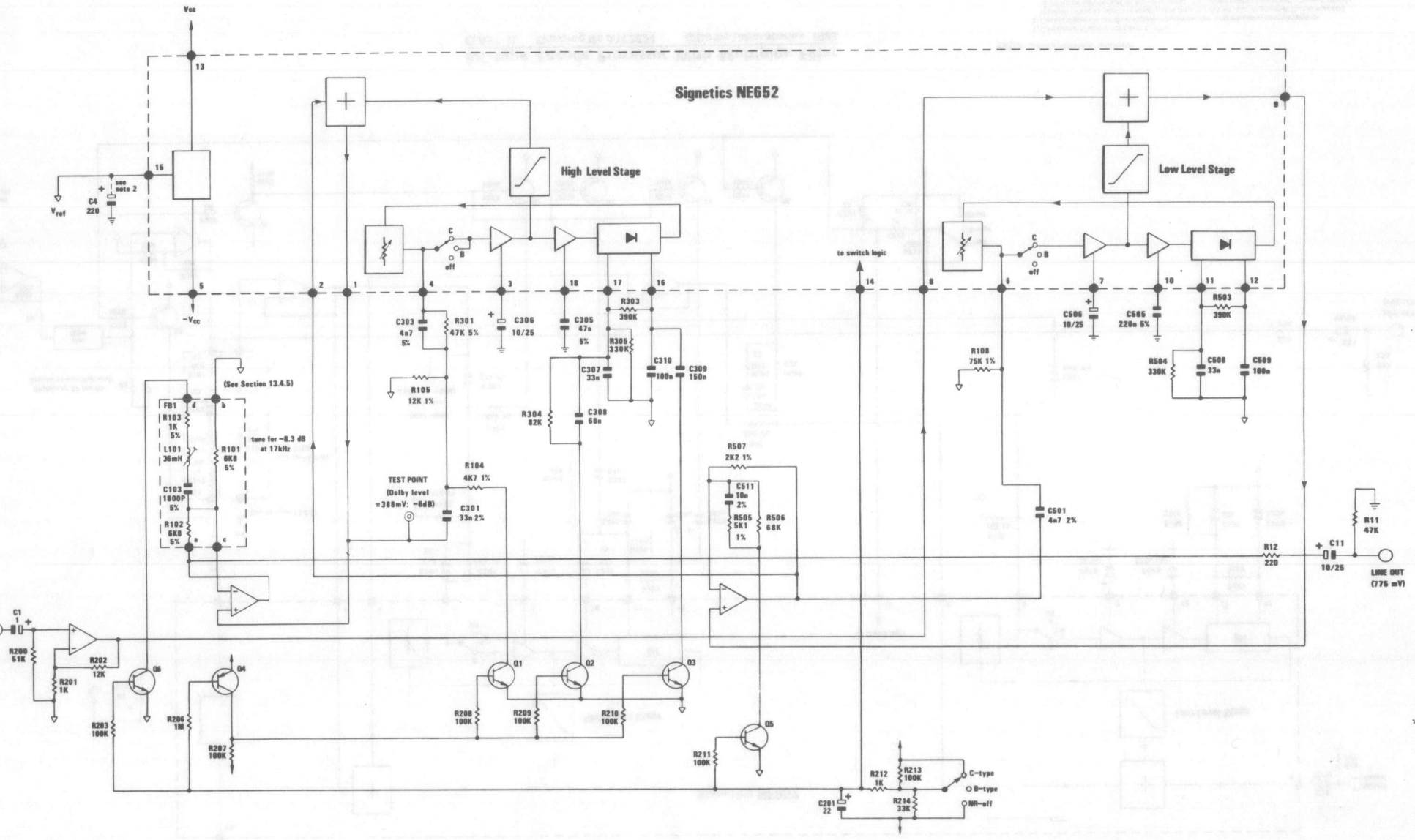
13.4.13

B/C-type Encode Processor With Multiplex Filter

CLASS II Drawing No A1C2824

NOTES: (Unless otherwise specified)

1. Component tolerances are ± 10%.
2. Circuit shown is for dual supply operation. For single supply, connect points marked + Vcc to positive supply and points marked -Vcc to ground. Points marked ⏚ must be connected to a true ground. For single supply operation, connect points marked ⏚ to -Vcc. For dual supply operation, connect points marked ⏚ and ▽ to ground. C4 not needed for dual supply operation.



B/C-type Decode Processor Without Filter

CLASS V Drawing No A1C2823 ©Dolby Laboratories 1983

NOTES: (Unless otherwise specified)

1. Component tolerances are ± 10%.
2. Circuit shown is for dual supply operation. For single supply, connect points marked + Vcc to positive supply and points marked -Vcc to ground. Points marked ⏚ must be connected to a true ground. For single supply operation, connect points marked ⏚ to -Vcc. For dual supply operation, connect points marked ⏚ and ⏚ to ground. C4 not needed for dual supply operation.