SHEET INDEX

CONTENTS	SHEET NO.	ISSUE NO. 1	2	3	4	5–50	SHEET NO.
SHEET INDEX OPTION INDEX SUPPORTING INFORMATION	A1	1	2	3	4		A1
FS1 TRANSMIT CIRCUIT	B1	1	2	3	4		B1
FS2 RECEIVE CIRCUIT							B2
FS3 SIGNALING CIRCUIT	B2	1	2	3	3		
APP FIG.1	C1	1	2	3	3		C1
CIRCUIT NOTES	C1	1	2	2	4		C1
EQUIPMENT NOTES	D2	1	1	1	1		D2
INFORMATION NOTES							

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWING	J98718SK
EQUIPMENT DESIGN REQUIREMENTS	J98718 (801-505-153)

DWG ISSUE	CD ISSUE	DATE ISSUED
1	1	3-11-75
2B	2B	8-25-75
3A	2B APP 1A	1-14-76
4B	2B APPX 2B	1-19-77

SHEET INDEX NOTES

1. WHEN CHANGES ARE MADE IN THIS DRAWING, ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

OPTION INDEX

APP OR WRG	RATED ON ISSUE	REF NOTES	LOCATION
Z	MD 2		2E1, 2F2, 2F7, 2F8 APP FIG. 1
Y	STD 2		2E1, 2F2, 2F7, 2F8 APP FIG. 1
X	MD 2		2E0, 2F8 APP FIG. 1
W	MD 2		2B1, 2B2 APP FIG. 1
V	STD 2		2B1, 2B2 APP FIG. 1
T	MD 2		2B2 APP FIG. 1
S	STD 2		2B2 APP FIG. 1

ISSUE 4B

SD- 3C225-01 IN22

COMMON SYSTEMS
SIGNALING

TYPE D3, 24-CHANNEL
PULSE CODE MODULATION BANK
4-WIRE, 600-OHM PULSE LINK REPEATER
CHANNEL UNIT
CIRCUIT

AT&TCO STANDARD

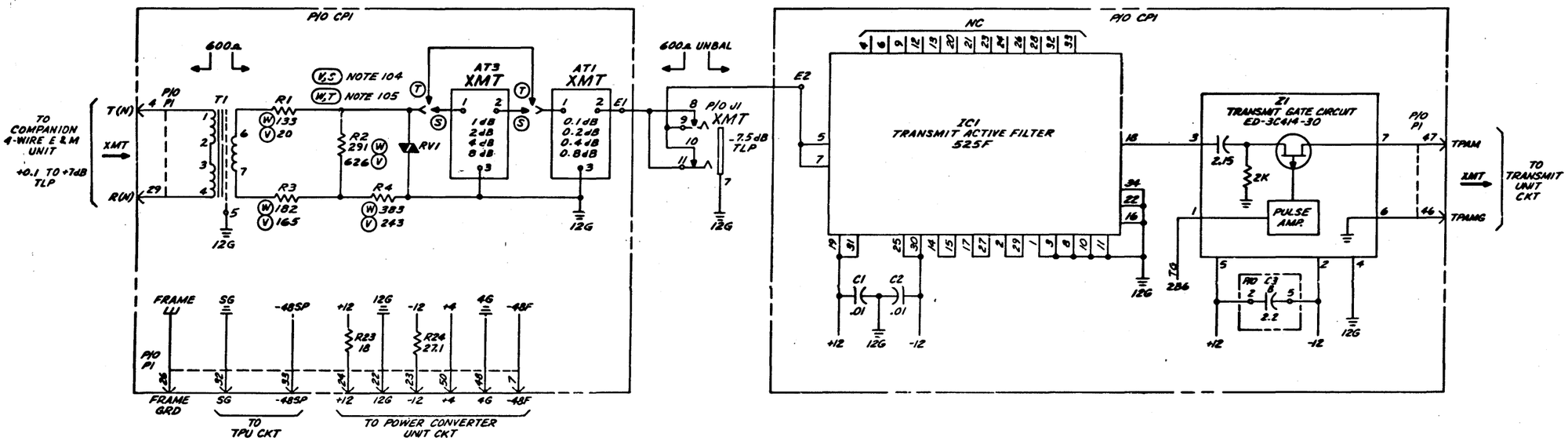
SD-3C225-01-AI

6 SHEETS

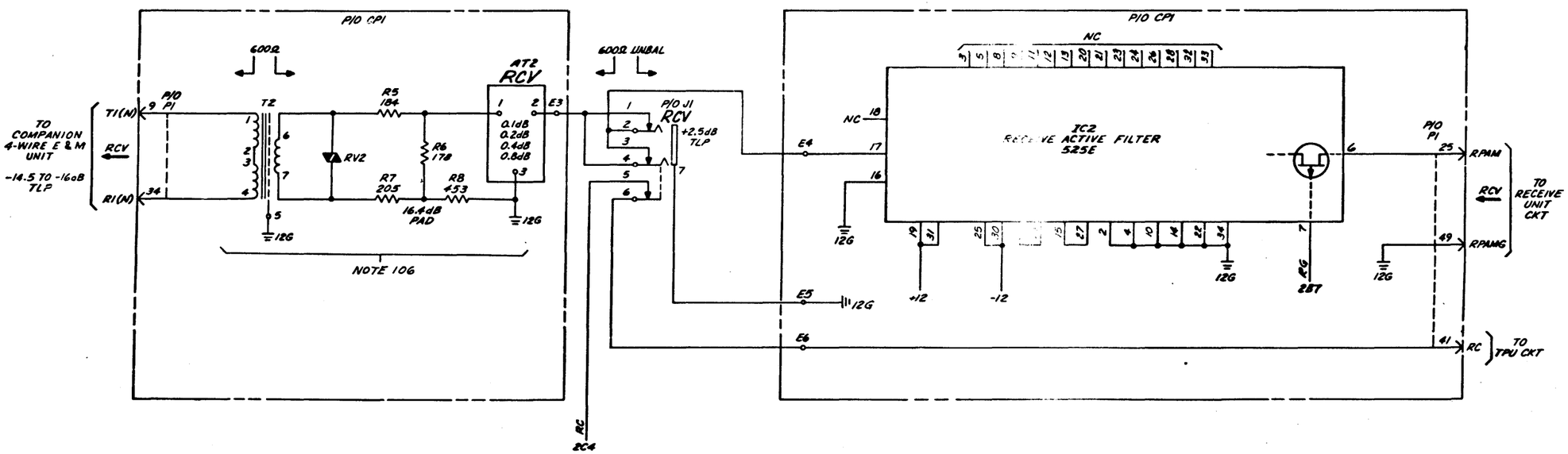
BELL TELEPHONE LABORATORIES INCORPORATED 6S

SD-3C225-01-AI

FS1
TRANSMIT CIRCUIT



FS2
RECEIVE CIRCUIT



ISSUE 4B

4-WIRE, 600-OHM PULSE LINK REPEATER CHANNEL UNIT	SD-3C225-01-BI
BELL TELEPHONE LABORATORIES INCORPORATED	SIZE 6S

SD-3C225-01-BI

FS3
SIGNALING CIRCUIT

P/O CP1

P/O P1

TO TRANSMIT UNIT CKT: TNWD 20, TQ(A) 18, TQ(B) 44

TO RECEIVE UNIT CKT: RQ(A) 17, RQ(B) 40, RNWD 16, RNSA 12, RNFA 37

TO COMPANION 4-WIRE E&M UNIT: EB(H) 6 → 12G

TO COMPANION 4-WIRE E&M UNIT: E(N) 3 → E9 → E J2

IC3 CHANNEL UNIT LOGIC 129D

19, 22, 23, 2, 4, 5, 6, 7

15, 16, 21, 20 TC, 10 RNDA, 9 RC, 11 RDA

P/O C3 1000PF (TG → IC6)

P/O C3 4990PF

CR1, E7, IG3

R9 499, Q2, R10 40.2K → -12, C4 100PF, R11 49.9K, R12 2.49K → +12, R6 IF7

-48SP: R13 45.3K, Q5, Q4, R14 1620, R15 6190, C5 0.1, M 1K, CR2, CR3, CR4, BB SCR SW

R16 1.5K, Q3, R17 10K, R18 1.5K → +4, 4G, SG

R19 3010, R21 8160, Q1, R22 14.9K → +12, RV3, 4G

J4 EQPT / FAC

R26 10K, R27 10.5K, R28 100K, Q7, R20 2K, TNSB 17, TNSA 18, TMA 288

Q6, R29 61.9K, R30 30.3K, CR6 → -12, R31 34.8K

RT1, -48F, Z SCR SW, Y SCR SW, M, R25 10, CR5, C6 0.1

P/O P1

45 TNB, 21 TNA, 19 TNEN → TO TRANSMIT UNIT CKT

13 TC, 42 TMA, 15 RMA(M) → TO TRMSN MONITOR UNIT CKT

2F3 TMA

5 BB, 31 BG → TO TPU CKT

28 MB, 27 M → TO COMPANION 4-WIRE E&M UNIT

M J3

3A

4-WIRE, 600-OHM PULSE LINK REPEATER CHANNEL UNIT	SD-3C225-01-B2
BELL TELEPHONE LABORATORIES INCORPORATED	6S

SD-3C225-01-B2

APP FIG. 1

CONNECTOR

	DESIG	LOC	CODE
[1]	XMT(J1)	1B3	601AM
[1]	RCV(J1)	1E3	601AM
(R)	E(J2)	2E0	KS-20667,L9
(X)	M(J3)	2F9	KS-20667,L13
(Y) [1]	EQPT(J4)	2E2	601A
[1]	FAC (J4)	2F2	601A

JACKS

SEE CONNECTOR

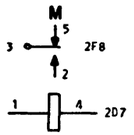
CIRCUIT PACK

DESIG	LOC	CODE
CP1	1A2,1A6,1D2, 1D6,2A4	ED-3C485-( )

E/W

RELAY

326A



ATTENUATOR

	DESIG	LOC	CODE
	AT1	1A2	50C
	AT2	1E2	50C
(S)	AT3	1B2	50E

CAPACITOR

	DESIG	LOC	CODE
	C1	1C4	KS-16048,L4,.01
	C2	1C5	KS-16048,L4,.01
[1]	C3A-C	1C7,2B5	734C, CAP PAK
	C4	2B6	KS-16958,L31,100PF
	C5	2C7	594C,0.1
	C6	2G8	594C,0.1

DIODE

	DESIG	LOC	CODE
	CR1	2C4	458C
	CR2	2D8	458A
	CR3	2D6	458A
	CR4	2D7	458A
	CR5	2G8	456F
(Y)	CR6	2F1	458A

CIRCUIT PACK (CONT)

INTEGRATED CKT

DESIG	LOC	CODE
IC1	1A5	525F
IC2	1E6	525E
IC3	2C3	129D

LAMP

DESIG	LOC	CODE
RT1	2F7	19A

NETWORK

DESIG	LOC	CODE
Z1	1B7	ED-3C414-30

RESISTOR

DESIG	LOC	CODE
R1	1B1	KS-20810,L1A (X)133 (X)20
R2	1B2	KS-20810,L1A (R)291 (R)626
R3	1B1	KS-20810,L1A (X)52 (X)165
R4	1B2	KS-20810,L1A (S)383 (X)243
R5	1E2	KS-20810,L1A,184
R6	1E2	KS-20810,L1A,178
R7	1F2	KS-20810,L1A,205
R8	1F2	KS-20810,L1A,453
R9	2C5	KS-20810,L1A,499
R10	2C5	KS-20810,L1A,40.2K
R11	2C6	KS-20810,L1A,49.9K
R12	2C6	KS-20810,L1A,2.49K
R13	2D5	KS-20810,L1A,45.3K
R14	2D7	KS-20810,L1A,162[illegible]
R15	2D7	KS-20810,L1A,619[illegible]
R16	2D4	KS-20810,L1A,1.5K
R17	2E5	KS-20810,L1A,10K
R18	2E5	KS-20810,L1A,1.5K
(Z) R19	2D1	KS-20810,L1A,3010
R20	2F3	KS-20810,L1A,2K
(Z) R21	2D1	KS-20810,L1A,8160
(R) R22	2E2	KS-20810,L1A,14.9K
R23	1C1	KS-20810,L1A,18
R24	1C2	KS-20810,L1A,27.1
R25	2F8	KS-14603,L3A,10
(Y) R26	2F2	KS-20810,L1A,10K
(X) R27	2F2	KS-20810,L1A,10.5K
(Y) R28	2F2	KS-20810,L1A,100K
(Y) R29	2F1	KS-20810,L1A,61.9K
(X) R30	2F1	KS-20810,L1A,38.3K
(Y) R31	2F2	KS-20810,L1A,34.8K

SCREW SWITCH

DESIG	LOC	CODE
BB	2D8	P-44P303
Y	2F6	P-44P303
Z	2F6	P-44P303

TRANSFORMER

DESIG	LOC	CODE
T1	1B1	2532AY
T2	1E1	2532AY

CIRCUIT PACK (CONT)

TRANSISTOR

	DESIG	LOC	CODE
(Z)	Q1	2D2	51A
	Q2	2C5	66J
	Q3	2D4	66G
	Q4	2D5	51A
	Q5	2D6	51B
(X)	Q6	2F1	51B
(Y)	Q7	2F2	66J

VARISTOR

	DESIG	LOC	CODE
	RV1	1B2	106A
	RV2	1E1	100A
(Z)	RV3	2D2	106A

SD-3C225-01-CI

3A

4-WIRE, 600-OHM PULSE LINK REPEATER CHANNEL UNIT	SD-3C225-01-CI
BELL TELEPHONE LABORATORIES INCORPORATED	6S

CIRCUIT NOTES:

101.

DESIG	FUSE AMP	POTENTIAL	ONE PER
BATTERY SYMBOL			VOLTAGE RANGE

102.

FEATURE OR OPTION	PROVIDE		
	APP FIG	APP OR WRG	QUANTITY

103.

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES						
CHANGED ON ISSUE	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT		
				STD	A&M	MD
2B	Z OR Y	Z		Y		Z
		X	108			Y
	W OR V	W		V		X
	T OR S	T		S		T

CIRCUIT NOTES:(CONT)

104. WHEN THE PLR UNIT IS MANUFACTURED TO OPTIONS V & S, THE COMBINED LOSS OF THE FIXED ATTENUATOR PAD V, AND TRANSFORMER T1 IN THE TRANSMIT PATH IS 7.6 dB. PROPER ATTENUATION INCLUDING OFFICE CABLING LOSS PLUS ANY VIA NET LOSS (VNL) REQUIREMENTS SHOULD BE SWITCHED IN USING THE COMBINATION OF TRANSMIT PATH ATTENUATORS AT3 AND AT1 TO OBTAIN THE -7.5 dB TLP AT THE XMT JACK. THE NORMAL INPUT LEVELS MAY RANGE FROM 0.1 dB TO +7.0 dB AT THE T AND R LEADS.

105. WHEN THE PLR UNIT IS MANUFACTURED TO OPTIONS W & T, THE COMBINED LOSS OF THE FIXED ATTENUATOR PAD W, AND TRANSFORMER T1 IN THE TRANSMIT PATH IS 13.0 dB. VARIABLE ATTENUATOR AT1 (XMT) IS USED TO BUILD OUT UP TO 1.5 dB OF CABLING LOSS FROM THE COMPANION 4W E & M UNIT, MAKING THE ALLOWABLE RANGE AT THE TRANSMIT INPUT OF THE UNIT +5.5 dB TO +7.0 dB.

106. ATTENUATION LOSS OF THE RECEIVE PATH BETWEEN THE T1/R1 LEADS AND RCV JACK WITH THE VARIABLE RCV ATTENUATOR AT2 SWITCHED OUT IS 17.0 dB. AT2 MAY BE USED TO VARY THE RECEIVE PATH OUTPUT TO THE COMPANION 4W E & M UNIT BETWEEN -14.5 dB AND -16 dB.

107. FOR CONNECTION INFORMATION SEE APPLICATION SCHEMATIC FOR THE D3 BANK SD-3C104-01.

108. SCREW SWITCHES Y AND Z MUST BE OPEN WHEN LOOPED SIGNALING LEADS ARE USED. Y AND Z MUST BE CLOSED IF LOOPED SIGNALING LEADS ARE NOT USED.

109. SCREW SWITCH BB MUST BE OPEN FOR A CONTINUOUS IDLE CONDITION TO BE TRANSMITTED ON THE M LEAD DURING A CARRIER FAILURE. SWITCH BB MUST BE CLOSED FOR A 2-SECOND IDLE, THEN CONTINUOUS BUSY FAILURE SEQUENCE.

110. PRIOR TO ISSUE 2B, X OPTION WAS ALWAYS FURNISHED.

EQUIPMENT NOTES:

201. "2" INDICATES PRINTED CONNECTOR FINGERS OF OF PWB PLUG END AND MATES WITH A 940A CONNECTOR.

202. DESIGNATIONS SHOWN IN BOLD CHARACTERS IN B SECTION ARE MARKED ON UNIT.

203. TO CLOSE A SCREW SWITCH, THE SCREW SHALL BE TIGHTENED SUFFICIENTLY TO INSURE CONTACT BETWEEN TERMINALS AND UNDERSIDE OF SCREW HEAD. CAUTION IN TIGHTENING SCREW IS RECOMMENDED TO AVOID SHEARING OF SCREW. TO OPEN A SCREW SWITCH, THE SCREW SHALL BE LOOSENED APPROXIMATELY FOUR COMPLETE TURNS. UNIT IS NORMALLY FURNISHED WITH SCREWS CLOSED.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
VALUES PRECEDED BY THE SYMBOL (+) PLUS OR (-) MINUS ARE IN VOLTS.

ISSUE 4B

4-WIRE, 600-OHM PULSE LINK REPEATER CHANNEL UNIT

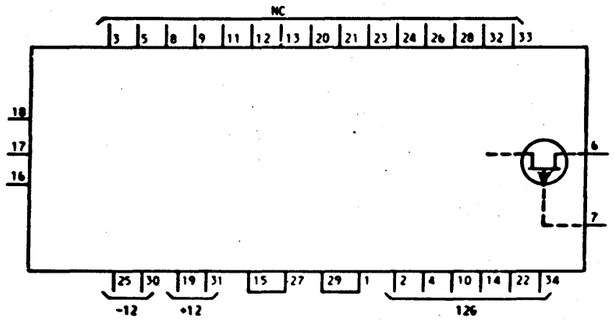
SD-3C225-01-D1

BELL TELEPHONE LABORATORIES INCORPORATED

6S

INFORMATION NOTES (CONT)
5.02 IC DEVICE CIRCUIT ELEMENTS

(a) **525E** RECEIVE ACTIVE FILTER



INPUT/OUTPUT INFORMATION

PIN 6 IS THE PRIMARY CHANNEL INPUT FOR THE RECEIVE PULSE AMPLITUDE MODULATED SIGNAL.

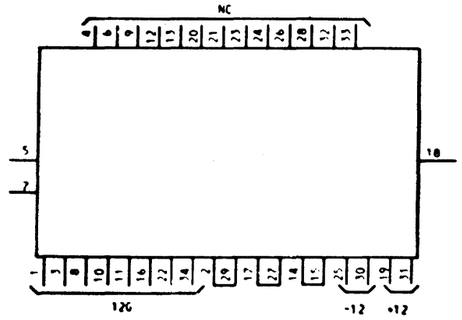
PIN 7 IS THE TIMING INPUT REQUIRED TO SAMPLE THE INDIVIDUAL CHANNEL.

PIN 17 IS THE PRIMARY CHANNEL OUTPUT FOR THE RECONSTRUCTED VOICE FREQUENCY SIGNAL.

CIRCUIT DESCRIPTION

THE RECEIVING ACTIVE FILTER, IC2, RECONSTRUCTS THE TRANSMITTED WAVEFORM FROM THE RECEIVED SAMPLES. IT EFFECTIVELY HAS A LOW-PASS CHARACTERISTIC WHICH SUPPRESSES FREQUENCY COMPONENTS IN THE INPUT ABOVE 4 kHz.

(b) **525F** TRANSMIT ACTIVE FILTER



INPUT/OUTPUT INFORMATION

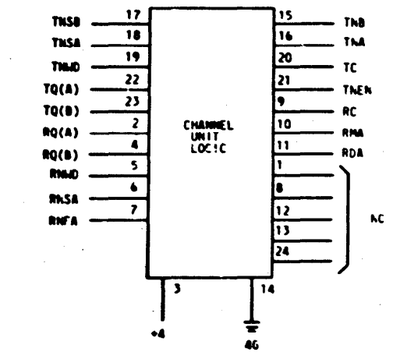
PIN 5 IS THE PRIMARY VOICE FREQUENCY SIGNAL INPUT.

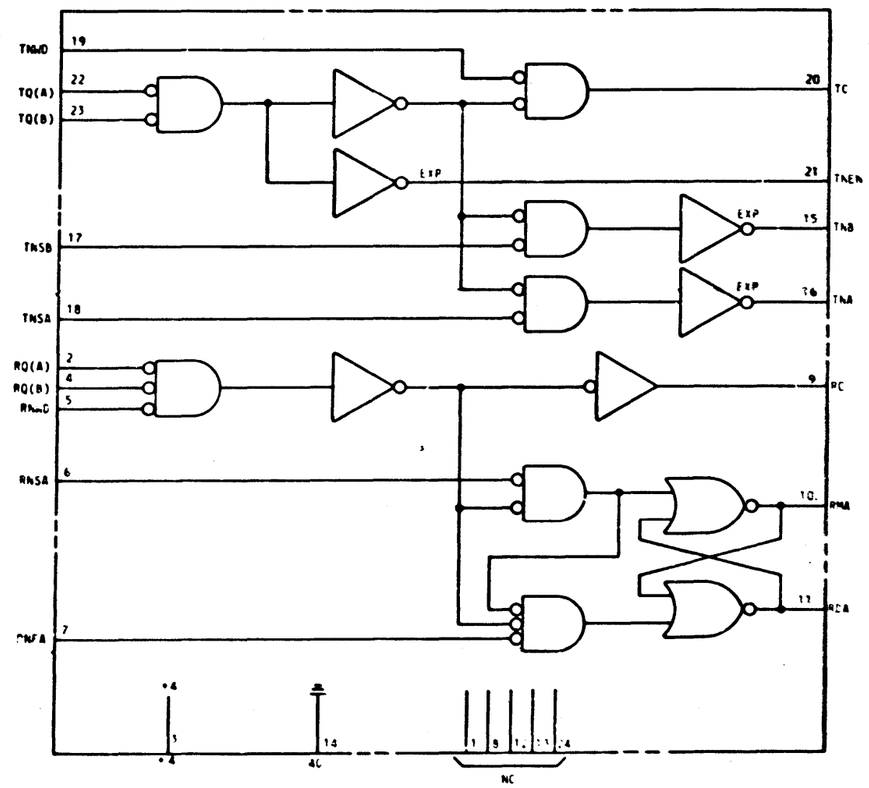
PIN 18 IS THE FILTERED VOICE FREQUENCY OUTPUT.

CIRCUIT DESCRIPTION

THE TRANSMIT ACTIVE FILTER, IC1, IS A LOW-PASS FILTER WHICH EFFECTIVELY SUPPRESSES FREQUENCIES ABOVE 4 kHz. THESE FREQUENCIES WOULD PRODUCE MODULATION PRODUCTS BELOW 4 kHz IF THEY WERE NOT SUPPRESSED.

(c) **129D** CHANNEL UNIT LOGIC





4 WIRE 600 OHM PULSE LINK REPEATER
CHANNEL UNIT

BELL TELEPHONE LABORATORIES INCORPORATED

SHEET 6S