SD-3C218-01

SHEET INDEX

CONTENTS	SHEET NO.	ISSUE NO. 1	2	3	4
SHEET INDEX SUPPORTING INFORMATION	A1	1	2	3	4
FS1 TRANSMITTER AMPLIFIER	B1	1	2	3	4
FS2 RECEIVER AMPLIFIER	B2	1	1	3	3
FS3 SIGNALING CIRCUIT	B3 *	1	2	3	3
APP FIG. 1	C1	1	2	3	4
CIRCUIT NOTES	D1	1	1	3	4
EQUIPMENT NOTES	D2	1	1	1	1
INFORMATION NOTES	D3	1	1	1	1

CONTENTS	SHEET NO.	ISSUE NO.

ISSUE	CD ISSUE	DATE ISSUED
1	1	7-30-75
2A	1 APP 1A	12-3-75
3A	1 APP 2A	4-2-76
4B	1 APP 3B	6-28-77

HIGHEST FES AND CAP... ON THIS

R62	17
R42, 1	8V4

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.

SUPPORTING INFORMATION

CATEGORY	NO.
EQUIPMENT DRAWING	J98718SC ED-3C495 ED-3C496 ED-3C497
EQUIPMENT REQUIREMENTS	J98718 (801-505-153)

NOTICE- NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT.

ISSUE 1

1N22

COMMON SYSTEMS SIGNALING

TYPE D3, 24 CHANNEL PULSE CODE MODULATION BANK 4-WIRE FOREIGN EXCHANGE OFFICE END CHANNEL UNIT CIRCUIT

AT&TCO STANDARD

SD-3C218-01-A1

8 SHEETS

BELL TELEPHONE LABORATORIES INCORPORATED

SIZE 6S

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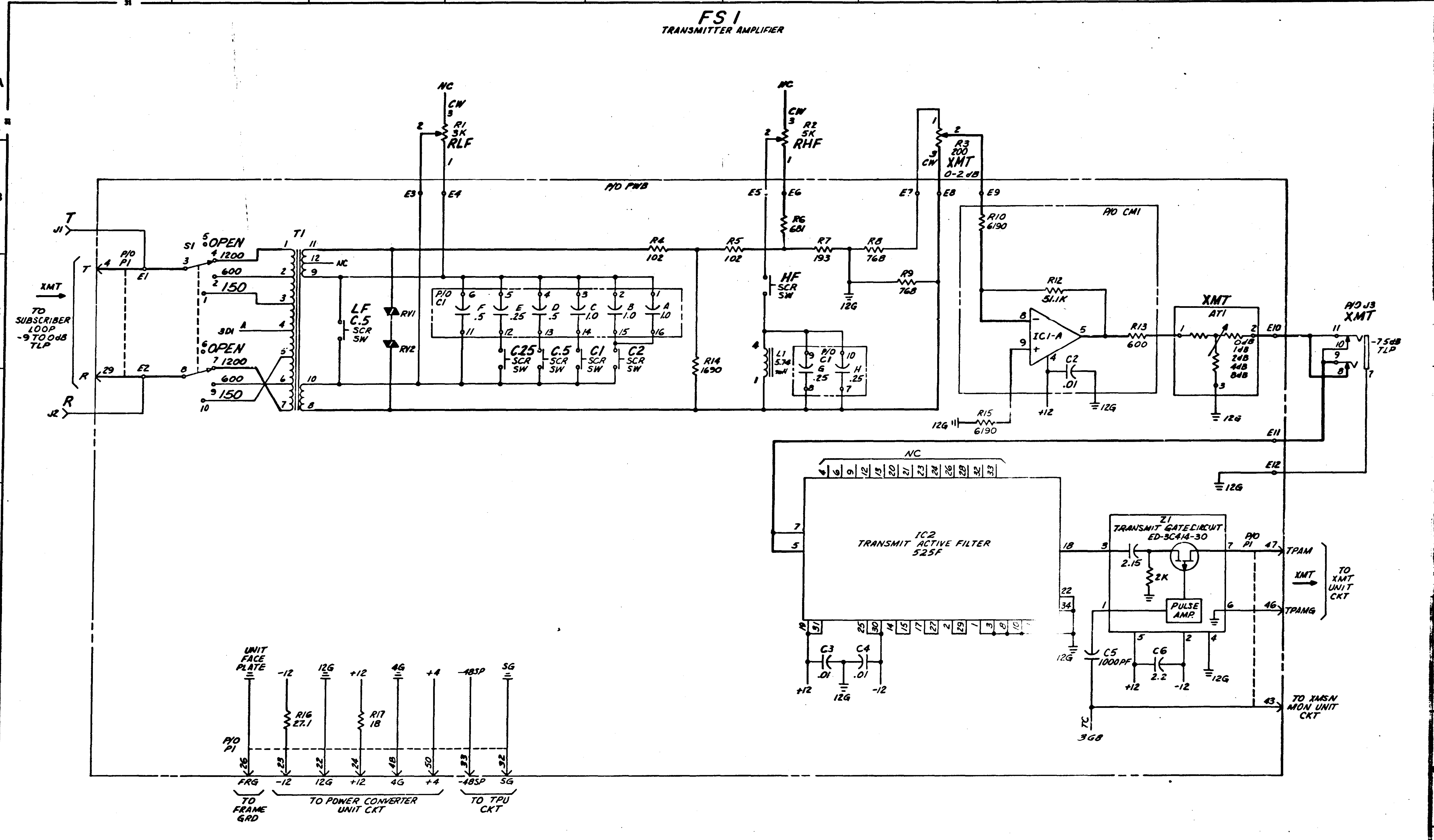
FS1
TRANSMITTER AMPLIFIER
P/O PWB
T
J1
R
J2
XMT
TO SUBSCRIBER LOOP -9 TO 0dB TLP
S1
OPEN
1200
600
150
T1
LF C.5 SCR SW
RV1
RV2
R1 3K RLF
R2 5K RHF
R3 200 XMT 0-2 dB
R4 102
R5 102
R6 681
R7 193
R8 768
R9 768
R14 1690
HF SCR SW
L1
P/O C1
P/O CM1
R10 6190
R12 51.1K
IC1-A
C2 .01
R13 600
R15 6190
XMT AT1
0dB
1dB
2dB
4dB
8dB
P/O J3 XMT
-7.5dB TLP
NC
IC2 TRANSMIT ACTIVE FILTER 525F
Z1 TRANSMIT GATE CIRCUIT ED-3C414-30
PULSE AMP.
C3 .01
C4 .01
C5 1000PF
C6 2.2
TPAM
TPAMG
TO XMT UNIT CKT
TO XMSN MON UNIT CKT
UNIT FACE PLATE
R16 27.1
R17 18
FRG
TO FRAME GRD
TO POWER CONVERTER UNIT CKT
TO TPU CKT
-48SP
SG

4-WIRE FOREIGN EXCHANGE OFFICE END CHANNEL UNIT

SD-3C218-01-B1

BELL TELEPHONE LABORATORIES INCORPORATED

6S

3F

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FS 2
RECEIVER AMPLIFIER

P/O PWB

E15 E16 E17

CW
R18 200 RCV 0-2dB

T1 J4

P/O P1 E13

S2 OPEN 4 1200 2 600 150

T2 1 11 12 NC 9

R19 298

12G

CR10

R20 115K SEE NOTE 105

R21 23.2K

IC1-B

R22 6190

R25 6190

C7 .01

P/O CM1

-12

R23 768

R24 1980

RCV AT2

0dB 1dB 2dB 4dB 8dB

E18

P/O J3 RCV

+25 dB TLP

TO SUBSCRIBER LOOP -9 TO +6dB TLP

RCV

R1 J5

E14

OPEN 7 1200 9 600 150

R26 298

P/O PWB

NC

IC 3 RECEIVE ACTIVE FILTER 525E

P/O P1 25 RPWM

RCV

RPWMG

+12 -12 12G

E19 E20 E21

CR1

41 RC TO TPC CKT

3FG RDA R27 1.5K Q1 4G

C8 4990PF RC 368

R28 499 Q2

R29 40.2K

C9 100PF

R30 49.9K

R31 2490

-12 -12

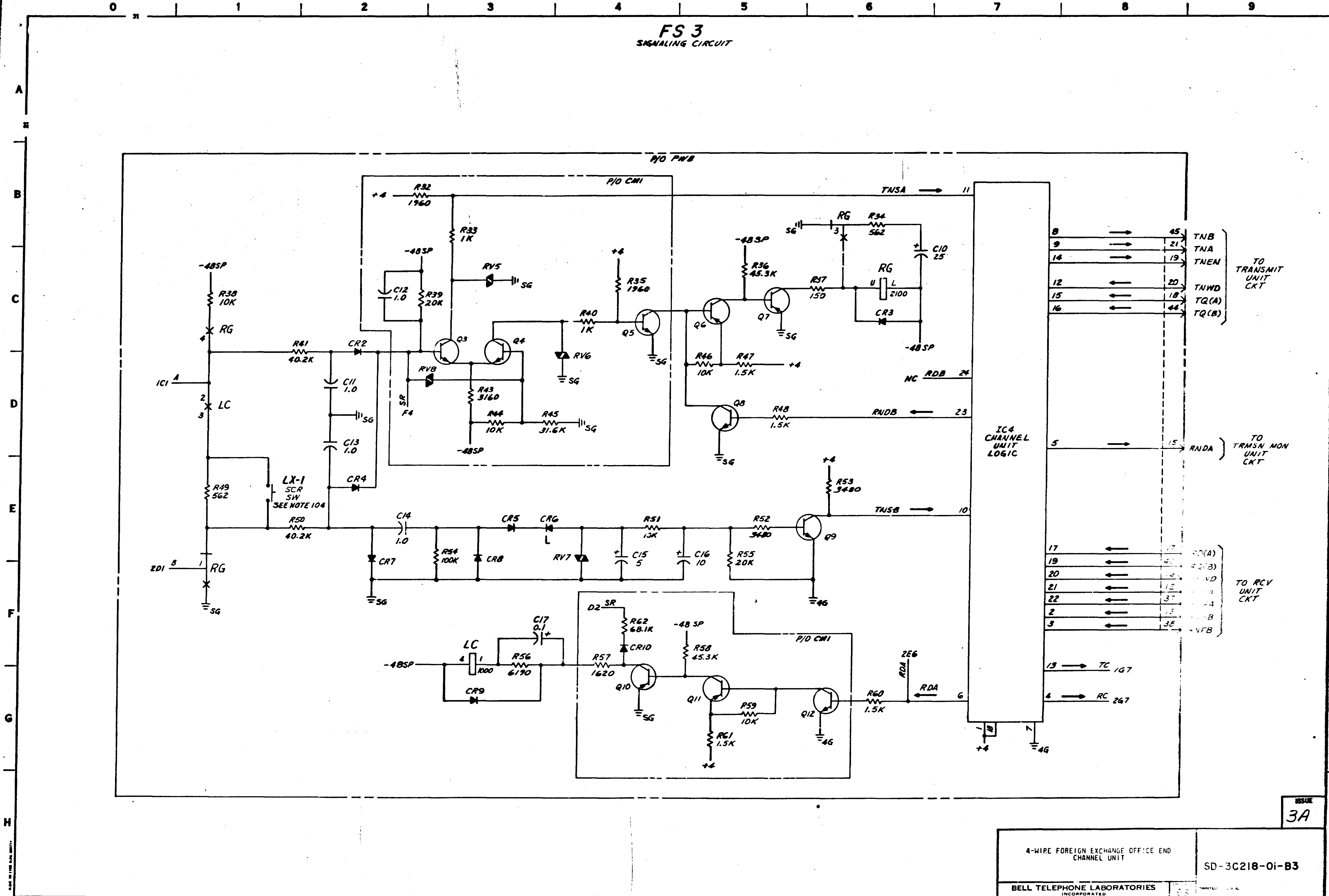
3A

4-TYPE [illegible] OFFICE END CHANNEL UNIT

BELL TELEPHONE LABORATORIES 6S

SD-3C218-01-B2

FS 3
SIGNALING CIRCUIT



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ISSUE 3A

4-WIRE FOREIGN EXCHANGE OFFICE END CHANNEL UNIT

SD-3C218-01-B3

BELL TELEPHONE LABORATORIES INCORPORATED

APP FIG. 1

CONNECTOR

DESIG	LOC	CODE
T(J1)	1B0	KS-20667,L9
R(J2)	1D0	KS-20667,L13
[1] XMT(J3)	1C9	601A
[1] RCV(J3)	2D6	
T1(J4)	2C0	KS-20667,L9
R1(J5)	2E0	KS-20667,L13

JACK

SEE CONNECTOR

POTENTIOMETER

DESIG	LOC	CODE
R1	1A3	KS-21423,L3
R2	1A5	KS-21423,L4
R3	1A6	KS-21423,L5
R18	2B4	KS-21423,L5

PRINTED WIRING BOARD

DESIG	LOC	CODE
PWB	1B4,2C2, 2C7	ED-3C495-( )

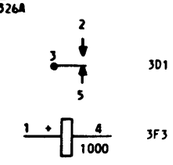
E/W

RELAY

DESIG	RG			
CODE	MA35A			
OPTION				
	CONT ARR	LOC	CONT ARR	LOC
4	EMB	3C1		
3	EBM	3B6		
2	EBM			
1	EMB	3F1		
COIL		3C6		

RELAY

LC
326A



ATTENUATOR

DESIG	LOC	CODE
AT1	1C8	50E
AT2	2D5	50E

PRINTED WIRING BOARD (CONT)

CAPACITOR

DESIG	LOC	CODE
[1] C1	1C3,1D5	734F CAP PACK
C3	1F5	KS-19774,L2,.01
C4	1F6	KS-19774,L2,.01
C5	1F7	KS-16742,L27,1000PF
C6	1F8	KS-20736,L2,2.2
C8	2F7	KS-16742,L27,4990PF
C9	2F8	KS-16958,L31,100PF
C10	3C6	KS-19524,L8,25
C11	3D2	596C,1.0
C13	3D2	596C,1.0
C14	3E2	596C,1.0
C15	3E4	601A,5.0
C16	3E5	601B,10.0
C17	3F3	594C,0.1

DIODE

DESIG	LOC	CODE
CR1	2E8	458C
CR2	3C2	456B
CR3	3C6	458A
CR4	3E2	456B
CR5	3E3	458C
CR6	3E4	459B
CR7	3E2	456B
CR8	3E3	458C
CR9	3G3	458A
CR10	2D2	521B

INDUCTOR

DESIG	LOC	CODE
L1	1C5	16228S,5.74 mH

INTEGRATED CIRCUIT

DESIG	LOC	CODE
IC2	1E6	525F
IC3	2C7	525E
IC4	3D7	129E

NETWORK

DESIG	LOC	CODE
Z1	1E8	ED-3C414-30

RESISTORS

DESIG	LOC	CODE
R4	1C4	KS-20810,L1A,102
R5	1C5	102
R6	1B5	681
R7	1C5	193
R8	1C6	768
R9	1C6	768
R14	1D4	1690
R15	1D6	6190
R16	1E7	27.1
R17	1E2	18
R19	2E2	298
R22	2E3	6190
R23	2E4	768
R24	2E4	1980
R25	2E3	6190
R26	2E2	298
R27	2E7	1.5K
R28	2E7	499
R29	2E7	40.2K
R30	2E8	49.9K
R31	2E8	2490
R34	3D6	562
R36	3C5	45.3K
R37	3C6	KS-20810,L1A,150

PRINTED WIRING BOARD (CONT)

RESISTORS (CONT)

DESIG	LOC	CODE
R38	3C1	KS-20810,L1A,10K
R41	3D2	KS-20810,L1A,40.2K
R46	3D5	KS-20810,L1A,10K
R47	3D5	KS-20810,L1A,1.5K
R48	3D5	KS-20810,L1A,1.5K
R49	3E1	KS-14603,L3CD,562
R50	3E2	KS-20810,L1A,40.2K
R51	3E4	KS-20810,L1A,10K
R52	3E5	KS-20810,L1A,3480
R53	3E6	KS-20810,L1A,3480
R54	3E3	KS-20810,L1A,100K
R55	3E5	KS-20810,L1A,20K
R56	3G3	KS-20810,L1A,6190
R60	3G6	KS-20810,L1A,1.5K

SCREW SWITCH

DESIG	LOC	CODE
C.25	1C3	
C.5	1C3	
C1	1C3	
[1] C2	1C4	841587785
HF	1C5	
LF C.5	1C2	
LX-1	3E1	840844039

SWITCH

DESIG	LOC	CODE
S1	1C1	KS-19104,L18
S2	2D1	KS-19104,L18

TRANSFORMER

DESIG	LOC	CODE
T1	1C1	2578BA
T2	2D1	2578BA

TRANSISTOR

DESIG	LOC	CODE
Q1	2F7	66J
Q2	2F8	66J
Q6	3C5	51A
Q7	3C5	51B
Q8	3D5	66G
Q9	3E5	66G

VARISTOR

DESIG	LOC	CODE
RV1	1C2	100A
RV2	1C2	106A
RV7	3E4	106A

CIRCUIT MODULE

DESIG	LOC	CODE
CM1	1B7,2E3 3B4,3F6	ED-7C087-( )

E/W

CAPACITOR

DESIG	LOC	CODE
C2	1D7	KS-19774,L2,.01
C7	2E3	KS-19774,L2,.01
C12	3C2	596C,1.0

PRINTED WIRING BOARD (CONT)

CIRCUIT MODULE (CONT)

DIODE

DESIG	LOC	CODE
CR10	3F4	458C

INTEGRATED CIRCUIT

DESIG	LOC	CODE
[1] IC1-A	1C7	502AR
[1] IC1-B	2D3	

RESISTOR

DESIG	LOC	CODE
R10	1B6	KS-20810,L1A,6190
R12	1C7	KS-20810,L1A,51.1K (SEE NOTE 7)
R13	1C8	KS-20810,L1A,600
R20	2D3	KS-20810,L1A,115K
R21	2D3	KS-20810,L1A,23.2K
R32	3B2	KS-20810,L1A,1960
R33	3C3	KS-20810,L1A,1K
R35	3C4	KS-20810,L1A,1960
R39	3C2	KS-20810,L1A,20K
R40	3C4	KS-20810,L1A,1K
R43	3D3	KS-20810,L1A,3160
R44	3D3	KS-20810,L1A,10K
R45	3D4	KS-20810,L1A,31.6K
R57	3G4	KS-20810,L1A,1620
R58	3F5	KS-20810,L1A,45.3K
R59	3G5	KS-20810,L1A,10K
R61	3G5	KS-20810,L1A,1.5K
R62	3F4	KS-20810,L1A,68.1K

TRANSISTOR

DESIG	LOC	CODE
Q3	3C3	66G
Q4	3C3	66G
Q5	3C4	66G
Q10	3G4	51B
Q11	3G5	51A
Q12	3G6	66G

VARISTOR

DESIG	LOC	CODE
RV5	3C3	106A
RV6	3D4	106A
RV8	3D3	106A

ISS-E
4E

4-WIRE FOREIGN EXCHANGE OFFICE END CHANNEL UNIT

SD-3C218-01-C1

BELL TELEPHONE LABORATORIES INCORPORATED

DRAWING SIZE 6S

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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 APP 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

CIRCUIT NOTES: (CONT)

104. SCREW SWITCH LX-1 SHALL BE CLOSED WHEN THE DC LOOP RESISTANCE OF THE CABLE BETWEEN THE SERVING CENTRAL OFFICE AND CHANNEL UNIT IS LONGER THAN 850 OHMS.

105. SELECT R20 DURING MANUFACTURE TO MEET GAIN REQUIREMENTS, 115K NOMINAL, 100K MIN. AND 1.9M MAX.

106. THIS RESISTOR IS TO BE SELECTED AT MANUFACTURE TO MEET GAIN REQUIREMENTS. IF THE RESISTOR VALUES FOR R12, SHOWN ON SHEET B2 IS INADEQUATE, A VALUE MAY BE SELECTED FROM THE FOLLOWING KS-20810L1A RESISTORS: 49.9K, 50.5K, 51.7K OR 52.3K.

EQUIPMENT NOTES:

201. "P1" INDICATES PRINTED CONNECTOR FINGERS 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 TWO COMPLETE TURNS.

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.

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ISSUE 4B

4-WIRE FOREIGN EXCHANGE OFFICE END CHANNEL UNIT

SD-3C218-01-D1

BELL TELEPHONE LABORATORIES INCORPORATED

CHNS BASE 6S

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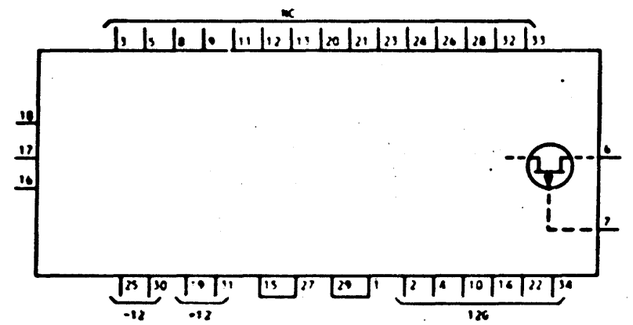
INFORMATION NOTES (CONT)
502. IC DEVICE CIRCUIT ELEMENTS

(A) 525E RECEIVE ACTIVE FILTER



INPUT/OUTPUT INFORMATION

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

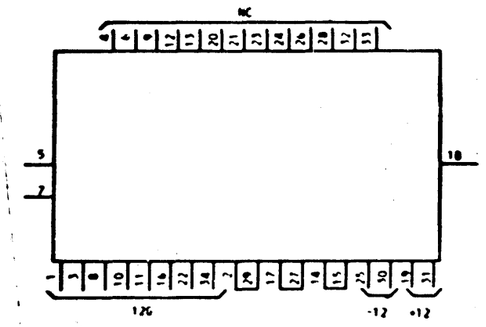
PIN 7 IS THE TIMING INPUT REQUIRED TO SAMPLE THE INDIVIDUAL CHANNEL.

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

CIRCUIT DESCRIPTION

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

(B) 525F TRANSMIT ACTIVE FILTER



INPUT/OUTPUT INFORMATION

PIN 5 IS THE PRIMARY VOICE FREQUENCY SIGNAL INPUT.

PIN 10 IS THE FILTERED VOICE FREQUENCY OUTPUT

CIRCUIT DESCRIPTION

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

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INFORMATION NOTES (CONT)

302. I.C. DEVICE CIRCUIT ELEMENTS (CONT)

(C) **129E** CHANNEL UNIT LOGIC

(D) **502AR** HYBRID INTEGRATED CIRCUIT, DUAL OPERATIONAL AMPLIFIER

BASIC SCHEMATIC (SIMPLIFIED)

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