MODEL +3B

FIGURE 1

# SPECIFICATIONS for +3B

A75046
Transistorized Microphone

**Sensitivity:** −23 db (0 db = 1 volt per microbar) when operating below compression level
**Output Impedance:** 5,000 ohms
**Amplifier Voltage Gain:** 0 to 33 db, adjustable
**Temperature Range:** −30°C (−22°F) to +65°C (149°F)
**Battery Drain:** 1.2 ma.
**Battery Life:** Approx. 6 months, based on average usage
**Battery Type:** Burgess 2U6, Eveready 216, Ray-o-vac 1604, or RCA VS-312. Battery is included
**Finish:** Black, baked enamel
**Weight:** 2 lbs. (.91 kg) less cable. Shipping weight 4 lbs. (1.8 kg)
**Cable:** 5 conductor, 1 shielded, coiled cord with black PVC jacket

## BATTERY REPLACEMENT

The battery in the base of the microphone should be replaced as needed with one of the types listed above. Turn the battery hold down spring clamp 90 degrees and remove the battery. Unclip the connector from the battery and install a fresh battery making sure the new battery is in position and well secured by the spring clamp.


**TURNER**
MICROPHONES
TURNER DIVISION OF CONRAC CORPORATION
716 Oakland Road N.E. Cedar Rapids, Iowa 52402
(319) 366-8311 • Telex 464437


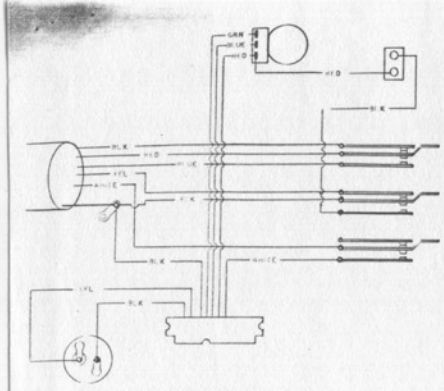

FIGURE 2

## +3B SCHEMATIC

Conversion of 6 Wire Microphones to 4-Wire Systems

Code (E)—Electronic Switching

| 6-Wire | 4-Wire |
|---|---|
| shield, red | shield |
| blue | black |
| black | red |
| white | white |
| yellow not used | |

Code (R)—Relay Switching

| 6-Wire | 4-Wire |
|---|---|
| shield | shield |
| blue | black |
| red | red |
| white | white |
| black & yellow not used | |

When wiring the Turner +3B microphone, consult the latest issue of the Turner wiring booklet. Upon obtaining the appropriate wiring information from either the wiring booklet or the factory, proceed with wiring the microphone cable to either the connector or transceiver.

The Turner +3B is a code (S), six wire microphone. Therefore, if your radio requires 4 wire, code (E), or 4 wire, code (R) switching, you must follow the conversion chart listed above. To use the chart, first determine if your radio is a code (E) or code (R). Then following the pin wiring, starting with pin one, find the color under the conversion chart's four wire system and connect the color's shown under the six wire system to pin one of the connector, terminal, or original cable. Continue until wiring is complete.

The +3B was designed to fill the need of a base station microphone with high modulation level capability. It is for use with all types of communication transmitters and transceivers.

Experience indicates that most difficulties in replacing a microphone occur as a result of poor workmanship in making up the connector. Avoid excessive heat which can damage insulation and keep exposed leads short to prevent shorting within the connector.

In case of difficulty, please do not tamper with the microphone as this will void the factory warranty. Contact factory for further instructions.

A LOSS IN MODULATION LEVEL MEANS A LOSS IN EFFECTIVE COMMUNICATIONS RANGE OF YOUR EQUIPMENT.

Many transceivers do not have sufficient amplification or adjustment of modulator amplification to be used conveniently with a base station microphone. The +3B is designed to be used at 8Ω to 16Ω. An additional gain of approximately 18 db is required when changing from a hand held close talk microphone to a base station microphone at 16Ω. The volume/gain control on the +3B should be set at the midpoint initially when changing from a close talk microphone. *Remember that this is a starting point and your modulation level should be verified on a monitor scope.* Insufficient modulation will cut your effective range and limit your ability to overcome local QRM conditions.


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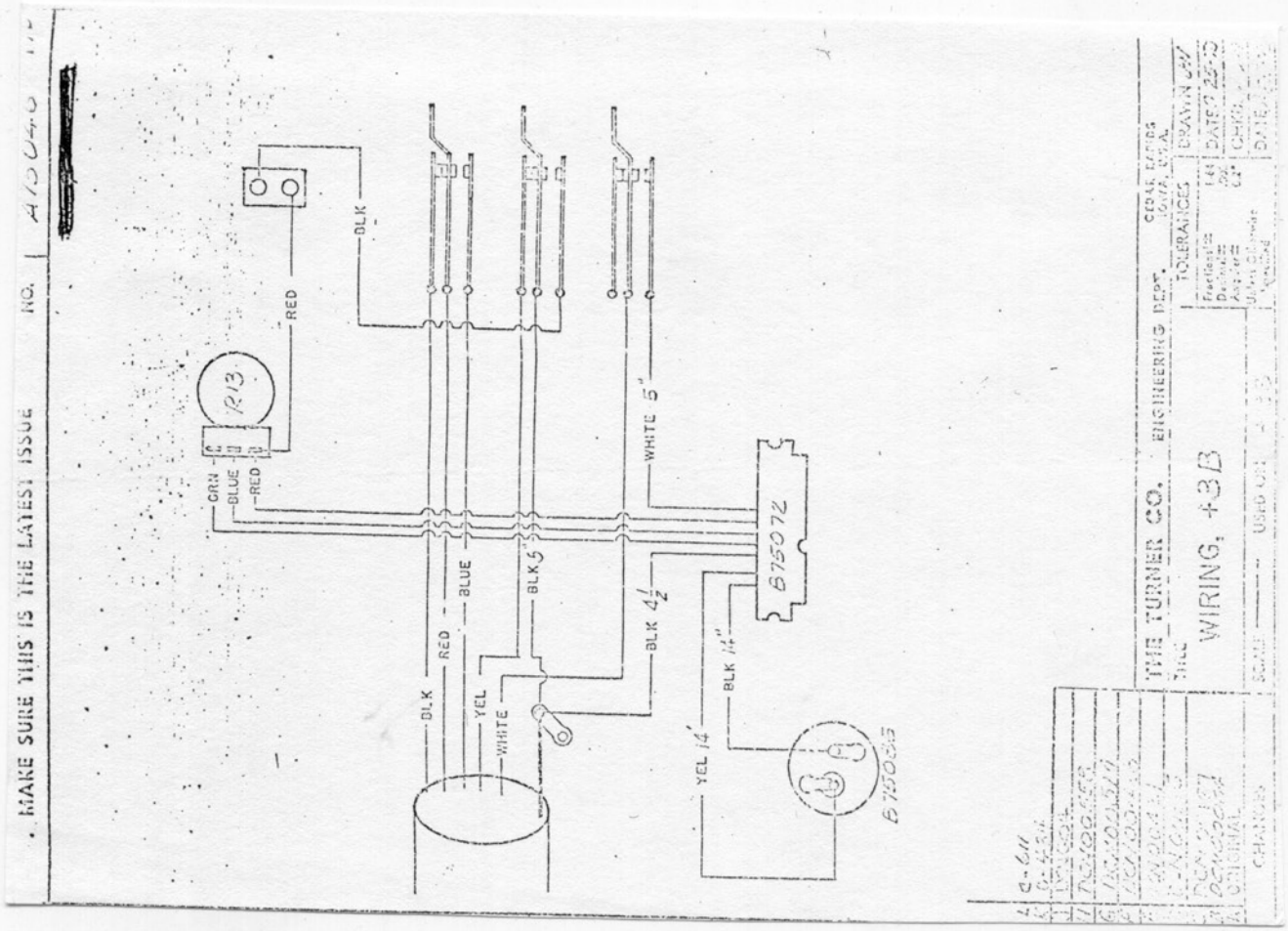
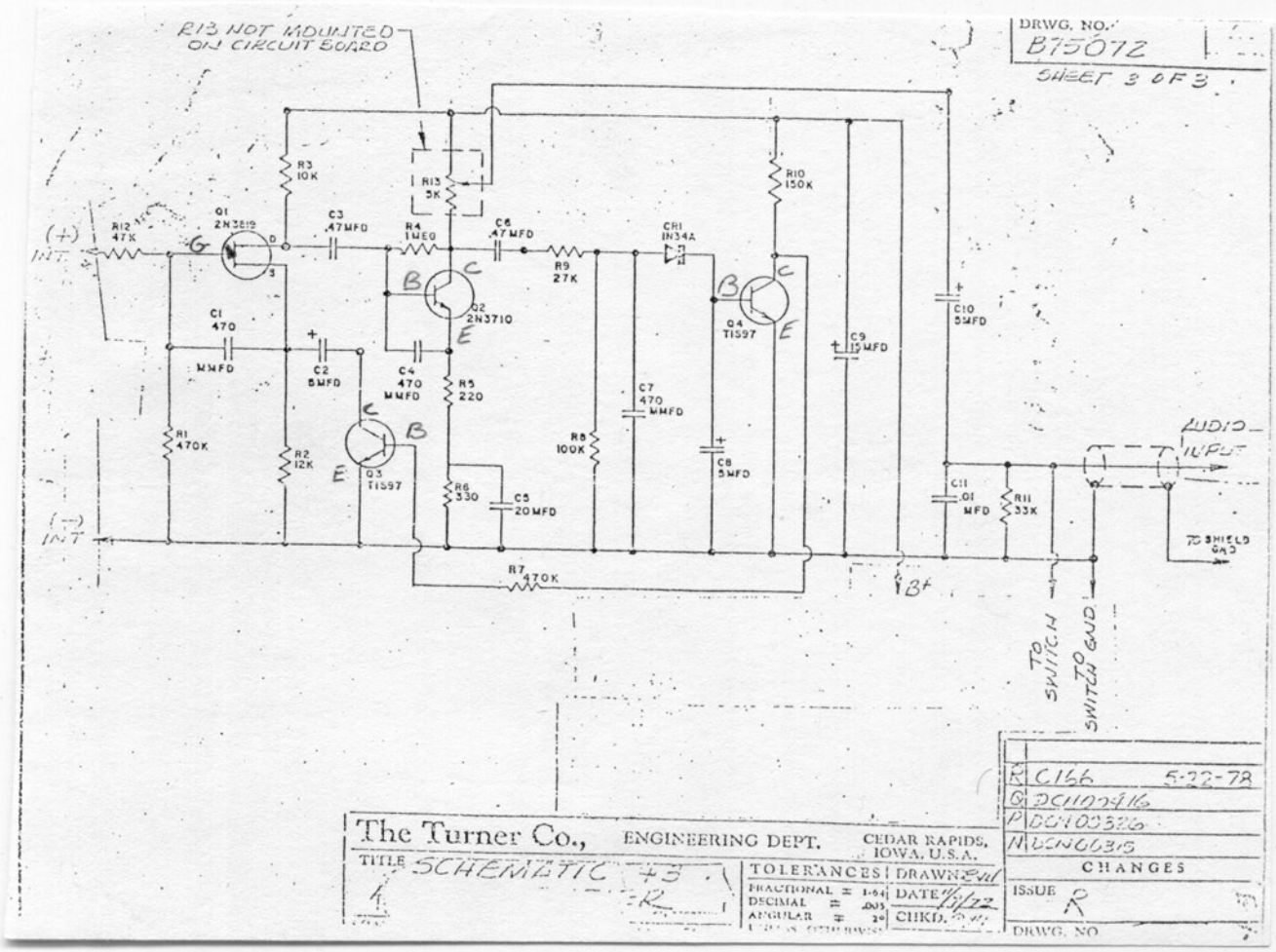
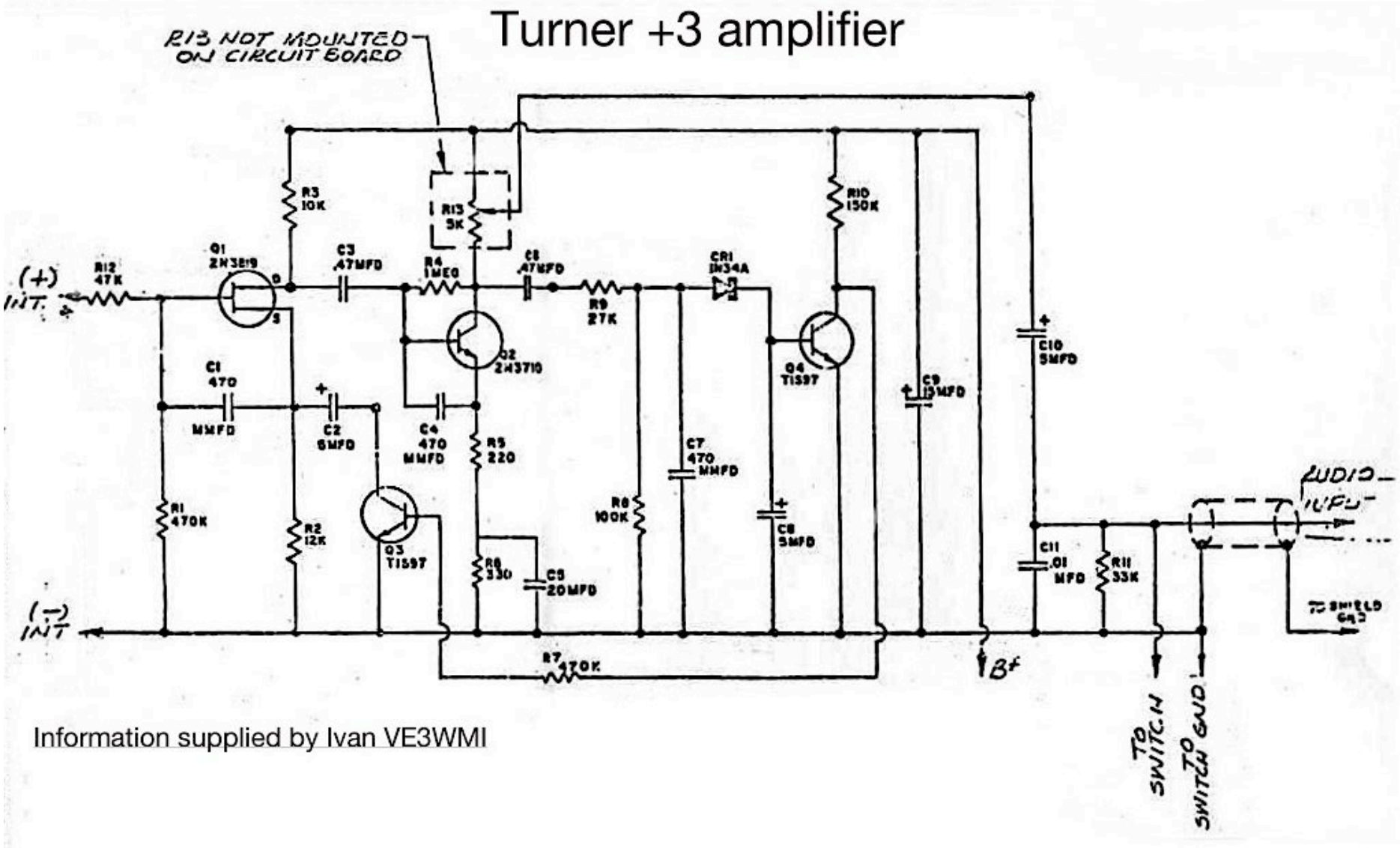
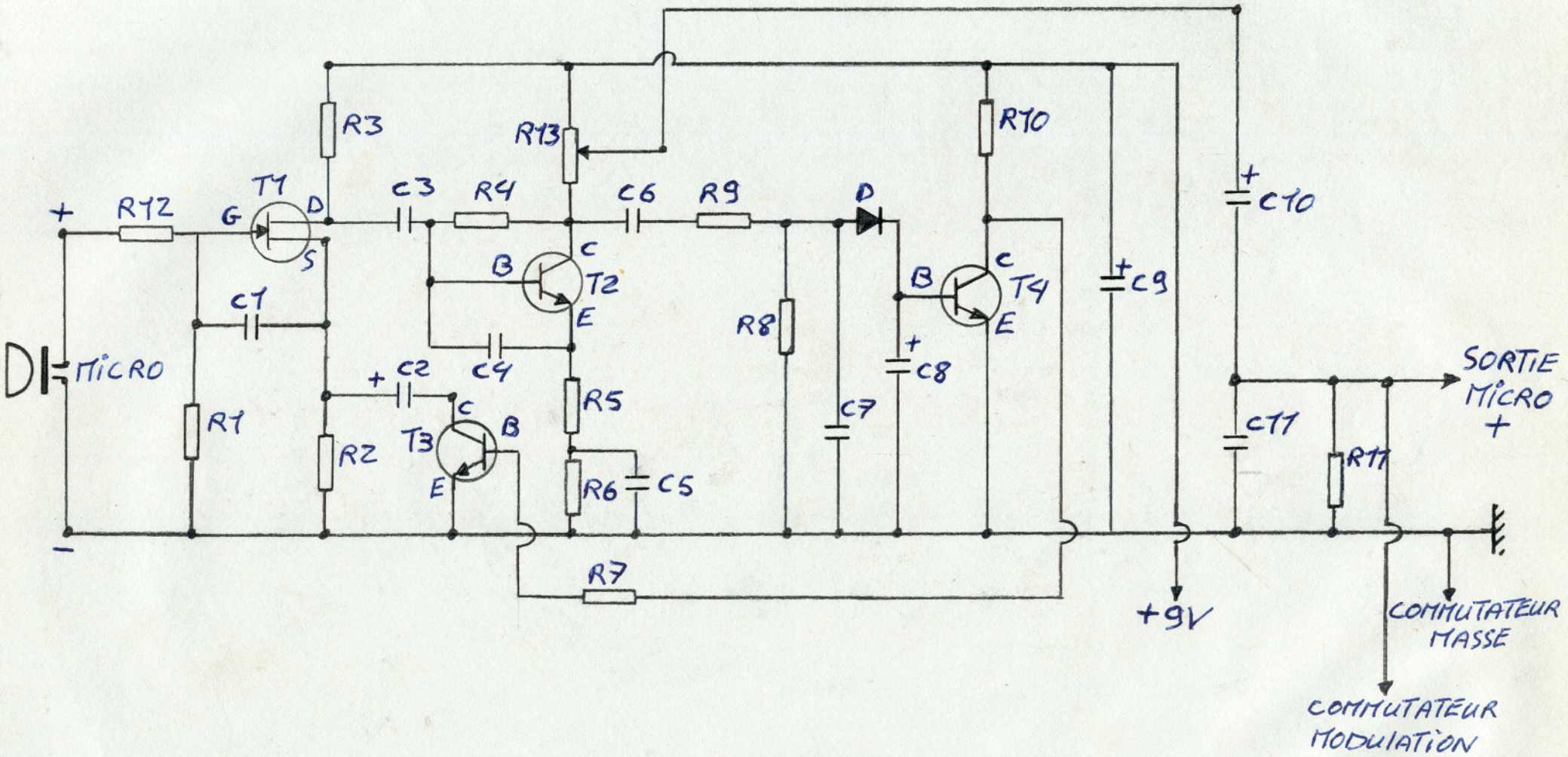

MAKE SURE THIS IS THE LATEST ISSUE
NO. 43640
R13
RED
BLK
GRN
BLUE
RED
WHITE 5"
BLK
RED
BLUE
BLK 5"
YEL
WHITE
BLK 4½"
YEL 14"
BLK 14"
B75072
B75063
THE TURNER CO.
ENGINEERING DEPT.
CEDAR RAPIDS IOWA, U.S.A.
TITLE
WIRING, 43B
TOLERANCES
DRAWN
DATE
CHKD.
SCALE
USED ON
SIZE
DRWG. NO.
ISSUE
CHANGES
ORIGINAL
DCN 6315
DCN 6326
DCN 6416
C156 5-22-78


R13 NOT MOUNTED ON CIRCUIT BOARD
DRWG. NO. B75072
SHEET 3 OF 3
R3 10K
R13 5K
R10 150K
Q1 2N3819
C3 .47MFD
R4 1MEG
C6 .47MFD
CR1 IN34A
R12 47K
R9 27K
Q2 2N3710
Q4 T1597
C10 5MFD
C1 470 MMFD
C2 5MFD
C4 470 MMFD
R5 220
C7 470 MMFD
C9 15MFD
R1 470K
R2 12K
Q3 T1597
R8 100K
C8 5MFD
R6 330
C5 20MFD
C11 .01 MFD
R11 33K
AUDIO INPUT
TO SHIELD GND
R7 470K
B+
TO SWITCH
TO SWITCH GND
The Turner Co., ENGINEERING DEPT. CEDAR RAPIDS, IOWA, U.S.A.
TITLE SCHEMATIC 43
TOLERANCES
FRACTIONAL ± 1-64
DECIMAL ± .005
ANGULAR ± 2°
DRAWN
DATE 5/5/72
CHKD.
DRWG. NO
CHANGES
ISSUE R
C156 5-22-78
DCN 6416
DCN 6326
DCN 6315

# Turner +3 amplifier

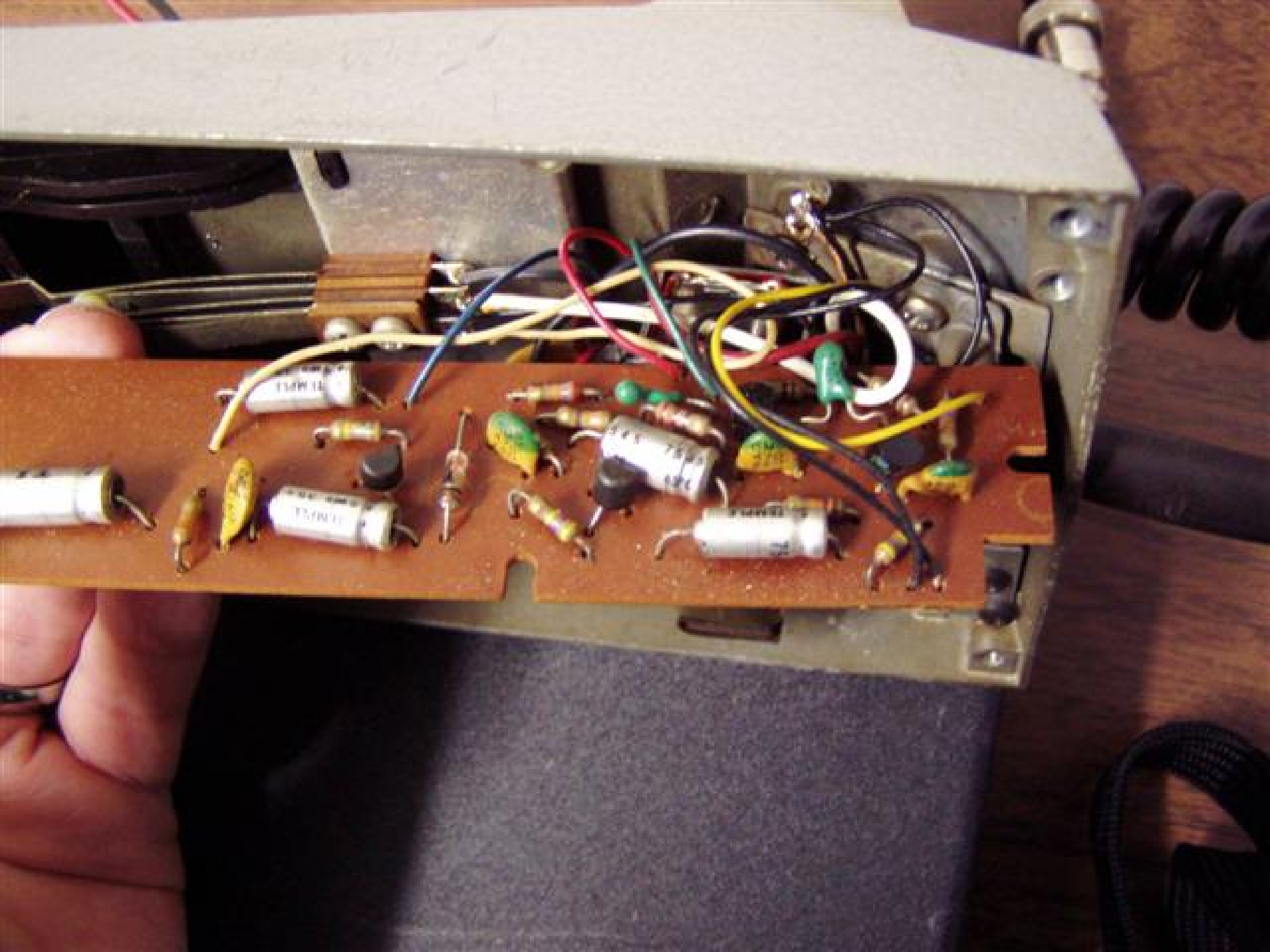


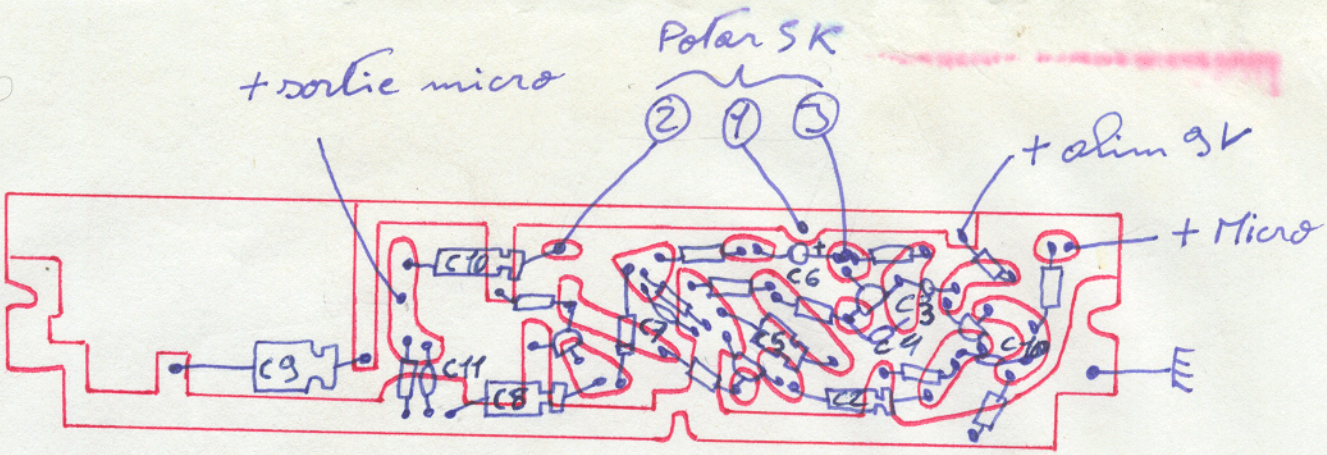

Information supplied by Ivan VE3WMI

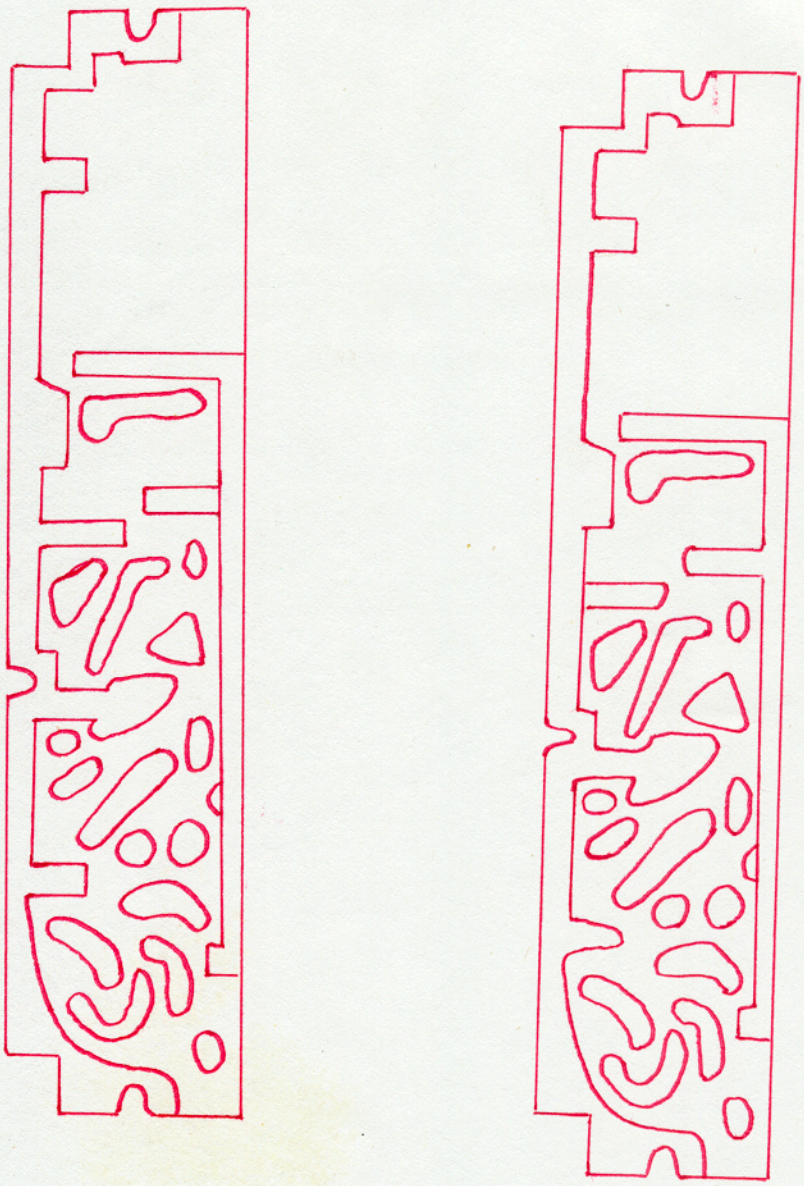


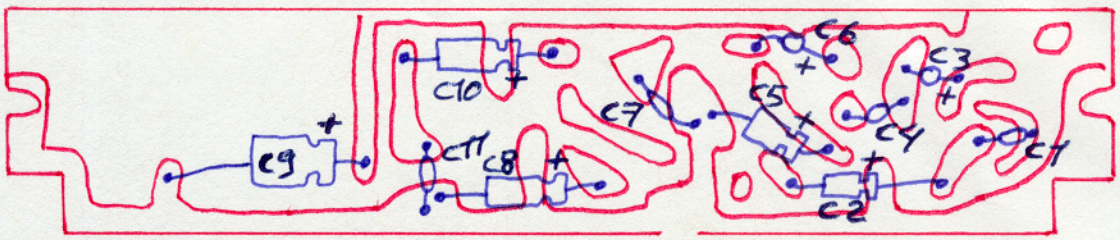

TURNER +3B

1972

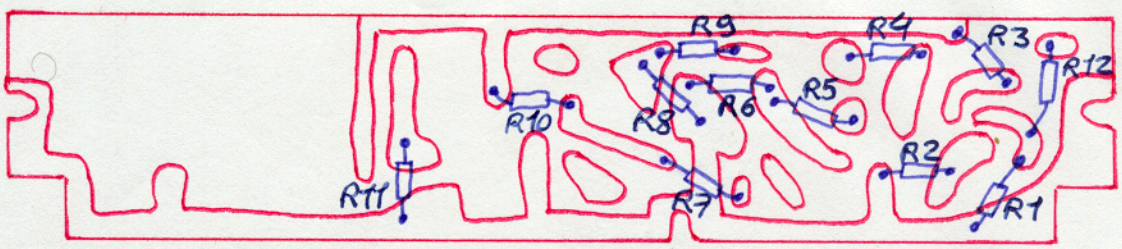



+ sortie micro
Polar SK
2
1
3
+ alim 9V
+ Micro
E
C10
C9
C11
C8
C7
C6
C5
C4
C3
C2
C1

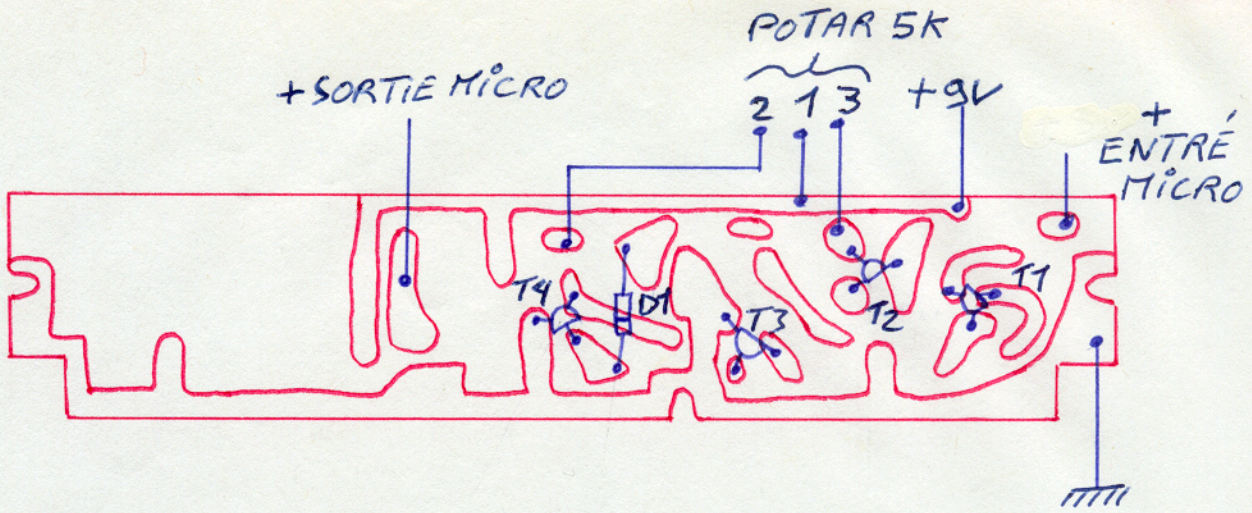





- C1 = 470 MFD
- C2 = 5 MFD polarisé
- C3 = 0,47 MFD
- C4 = 470 MFD
- C5 = 20 MFD (22 MFD polarisé)
- C6 = 0,47 MFD (0,47 MFD Tantal)
- C7 = 470 MFD
- C8 = 5 MFD Polarisé
- C9 = 15 MFD polarisé
- C10 = 5 MFD polarisé
- C11 = 0,01 MFD




- R1 = 470K
- R2 = 12K
- R3 = 10K
- R4 = 10M
- R5 = 220
- R6 = 330
- R7 = 470K
- R8 = 100K
- R9 = 27K
- R10 = 150K
- R11 = 33K
- R12 = 47K
- R13 = Potentiomètre 5K




- T1 = TIS 58N (ou 2N 3819)
- T2 = 2N 3710
- T3 = TIS 97
- T4 = 2N 5828 (TIS 97)
- D1 = 1N 34 A

- R1 = 470K
- R2 = 12K
- R3 = 10K
- R4 = 10M
- R5 = 220
- R6 = 330
- R7 = 470K
- R8 = 100K
- R9 = 27K
- R10 = 150K
- R11 = 33K
- R12 = 47K
- R13 = Potentiomètre 5K

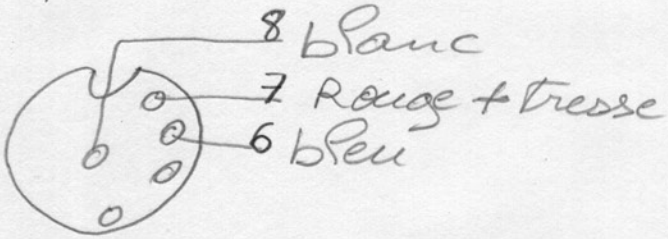
- C1 = 470 MFD
- C2 = 5 MFD Polarisé
- C3 = 0,47 MFD
- C4 = 470 MFD
- C5 = 20 MFD (22 MFD Polarisé)
- C6 = 0,47 MFD (0,47 MFD Tantal)
- C7 = 470 MFD
- C8 = 5 MFD Polarisé
- C9 = 15 MFD Polarisé
- C10 = 5 MFD Polarisé
- C11 = 0,01 MFD

- T1 = TIS 58N (2N3819)
- T2 = 2N3710
- T3 = TIS 97
- T4 = 2N5828 (TIS 97)
- D1 = 1N34A
- Micro, capsule céramique.

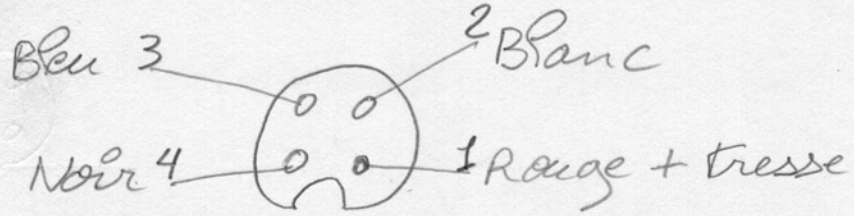
Branchement original du Turner +3b

correspondance des fils.
blanc = modulation (microphone)
Tresse = masse
bleu = émission (PTT)
Noir = reception
Jaune = Ne pas utiliser
Rouge = commun

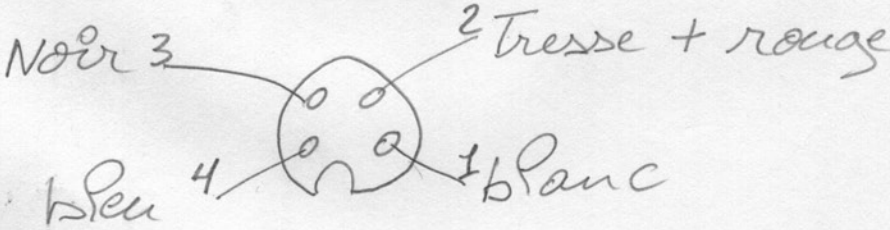
Branchement sur yaesu 8 broches.
prise micro vue coté soudures.




Branchement sur Bresident 4 broches.
prise micro vue coté soudures.




Branchement sur Kidland 4 broches.
prise micro vue coté soudures.



# 2N 3707 through 2N 3711
# 2N 4058 through 2N 4062

NPN . PNP SILICON AF SMALL SIGNAL TRANSISTORS

THE 2N3707 THROUGH 2N3711 (NPN) AND 2N4058 THROUGH 2N4062 (PNP) ARE COMPLEMENTARY SILICON PLANAR EPITAXIAL TRANSISTORS FOR USE IN AF SMALL SIGNAL AMPLIFIER STAGES AND DIRECT COUPLED CIRCUITS.

CASE TO-92B

ECB

| ABSOLUTE MAXIMUM RATINGS For p-n-p devices, voltage and current values are negative | | (NPN) 2N3707 thru' 2N3711 | (PNP) 2N4058 thru' 2N4062 |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 30V | 30V |
| Collector-Emitter Voltage | $V_{CEO}$ | 30V | 30V |
| Emitter-Base Voltage | $V_{EBO}$ | 6V | 6V |
| Collector Current | $I_C$ | 200mA | 100mA ** |
| Total Power Dissipation ($T_A \leq 25^oC$) | $P_{tot}$ | 360mW<br>derate 2.88mW/°C above 25°C | |
| Operating Junction & Storage Temperature | $T_j$, $T_{stg}$ | -55 to 150°C | |

** 30mA in JEDEC registration.

ELECTRICAL CHARACTERISTICS ($T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOL | NPN MIN | NPN MAX | PNP MIN | PNP MAX | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 30 | | 30 | | V | $I_C$=0.01mA $I_E$=0 |
| Collector-Emitter Breakdown Voltage | $LV_{CEO}$ | 30 | | 30 | | V | $I_C$=1mA $I_B$=0(Pulsed) |
| Collector Cutoff Current | $I_{CBO}$ | | 100 | | 100 | nA | $V_{CB}$=20V $I_E$=0 |
| Emitter Cutoff Current | $I_{EBO}$ | | 100 | | 100 | nA | $V_{EB}$=6V $I_C$=0 |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | | 1 | | 0.7 | V | $I_C$=10mA $I_B$=0.5mA |
| Base-Emitter Voltage | $V_{BE}$ | 0.5 | 1 | 0.5 | 1 | V | $I_C$=1mA $V_{CE}$=5V |
| Noise Figure * | NF | | | | 5 | dB | $I_C$=0.1mA $V_{CE}$=5V $R_G$=5KΩ f=30Hz-15KHz |
| | | | 5 | | | dB | $I_C$=0.1mA $V_{CE}$=5V $R_G$=10KΩ f=30Hz-15KHz |

* For 2N3707 and 2N4058 only.

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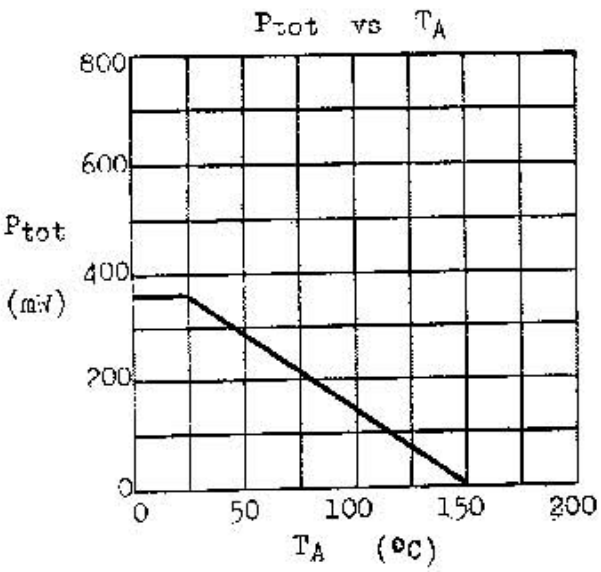
KWUN TONG P. O. BOX69427 CABLE ADDRESS "MICROTRON"
TELEPHONE:- 3-430181-9 3-693363, 3-692423
FAX: 3-410321

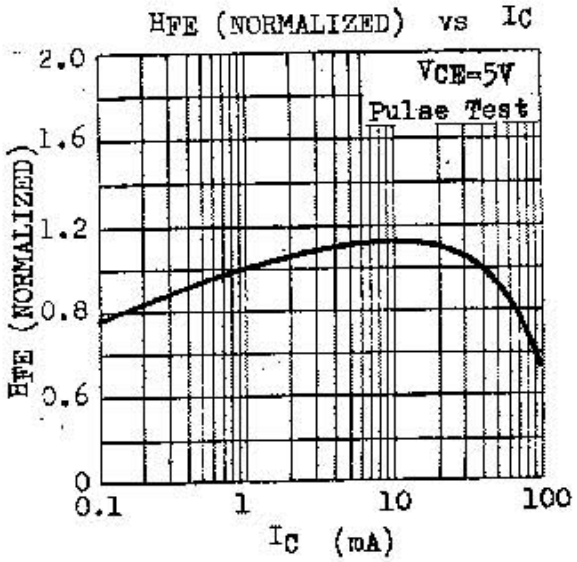
- - - Continued - - -

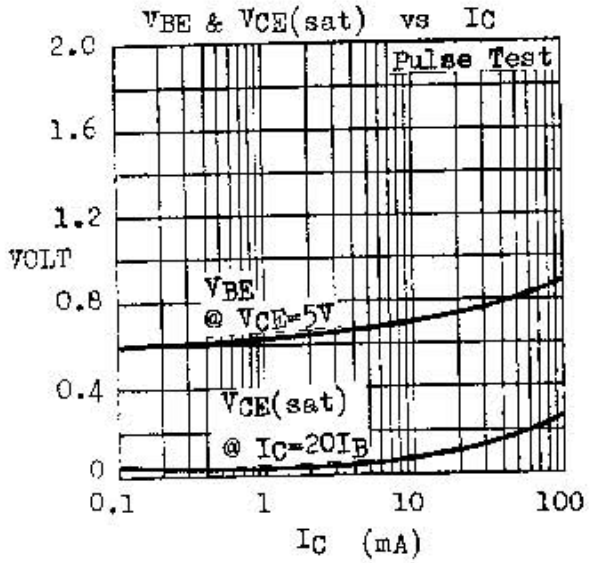
D.C. AND SMALL SIGNAL CURRENT GAIN ($H_{FE}$, $h_{fe}$) AT $V_{CE}$=5V $T_A$=25°C

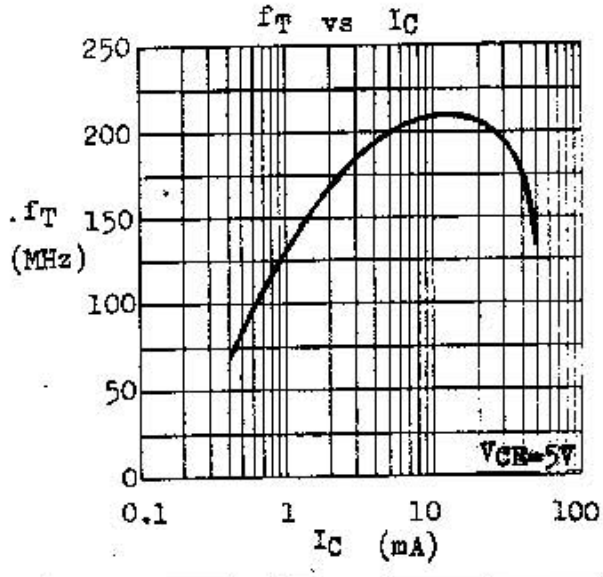
| PARAMETER / NPN / PNP | 2N3707 2N4058 MIN | MAX | 2N3708 2N4059 MIN | MAX | 2N3709 2N4060 MIN | MAX | 2N3710 2N4061 MIN | MAX | 2N3711 2N4062 MIN | MAX |
|---|---|---|---|---|---|---|---|---|---|---|
| $H_{FE}$ at $I_C$=0.1mA | 100 | 400 | | | | | | | | |
| $H_{FE}$ at $I_C$=1mA | | | 45 | 660 | 45 | 165 | 90 | 330 | 180 | 660 |
| $h_{fe}$ at $I_C$=0.1mA f=1KHz | 100 | 550 | | | | | | | | |
| $h_{fe}$ at $I_C$=1mA f=1KHz | | | 45 | 800 | 45 | 250 | 90 | 450 | 180 | 800 |

## TYPICAL CHARACTERISTICS AT $T_A$=25°C



| Data sheet | |
|---|---|
| status | Preliminary specification |
| date of issue | October 1990 |

# 2N3819
## N-channel J-FET

### FEATURES

- Low cost
- Specified at 100 MHz
- Automatic insertion package.

### DESCRIPTION

N-channel junction field-effect transistor in a plastic TO-92 envelope. It is intended for use in general purpose amplifiers and for analog switching.

### PINNING - TO-92

| PIN | DESCRIPTION |
|---|---|
| 1 | drain |
| 2 | gate |
| 3 | source |

### PIN CONFIGURATION

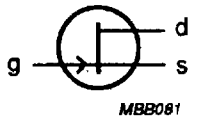



Fig.1 Symbol.



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# N-channel J-FET | 2N3819

## LIMITING VALUES

In accordance with the Absolute Maximum System (IEC 134)

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $\pm V_{DS}$ | drain-source voltage | | - | 25 | V |
| $-V_{GSO}$ | gate-source voltage | open drain $I_D = 0$ | - | 25 | V |
| $V_{DGO}$ | drain-gate voltage | open source $I_S = 0$ | - | 25 | V |
| $I_G$ | gate current | | - | 10 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} = 25$ °C | - | 360 | mW |
| $T_{stg}$ | storage temperature range | | −65 | 150 | °C |
| $T_j$ | junction temperature | | - | 150 | °C |

## THERMAL RESISTANCE

| SYMBOL | PARAMETER | VALUE | UNIT |
|---|---|---|---|
| $R_{th\ j\text{-}a}$ | from junction to ambient | 347 | K/W |

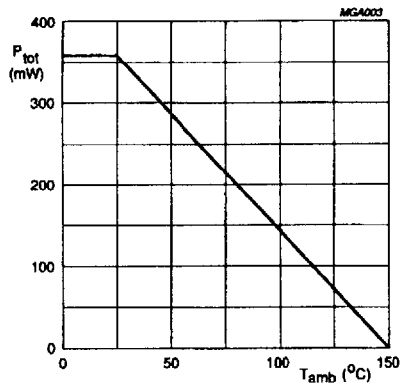


Fig.2 Total power dissipation as a function of ambient temperature.



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# N-channel J-FET

# 2N3819

## CHARACTERISTICS

$T_{amb}$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| $-V_{(BR)GSS}$ | gate-source breakdown voltage | $V_{DS}$ = 0<br>$-I_G$ = 1 µA | 25 | - | V |
| $-I_{GSS}$ | gate-source leakage current | $-V_{GS}$ = 15 V<br>$V_{DS}$ = 0 | - | 2 | nA |
| | | $-V_{GS}$ = 15 V<br>$V_{DS}$ = 0<br>$T_{amb}$ = 100 °C | - | 2 | µA |
| $I_{DSS}$ | drain-source current | $V_{GS}$ = 0<br>$V_{DS}$ = 15 V | 2 | 20 | mA |
| $-V_{GS}$ | gate-source voltage | $I_D$ = 200 µA<br>$V_{DS}$ = 15 V | 0.5 | 7.5 | V |
| $-V_{(P)GS}$ | gate-source cut-off voltage | $I_D$ = 2 nA<br>$V_{DS}$ = 15 V | - | 8 | V |
| $\|y_{fs}\|$ | transfer admittance | $V_{DS}$ = 15 V<br>$V_{GS}$ = 0<br>f = 1 kHz | 2 | 6.5 | mS |
| $\|y_{fs}\|$ | transfer admittance | $V_{DS}$ = 15 V<br>$V_{GS}$ = 0<br>f = 100 MHz | 1.6 | - | mS |
| $\|y_{os}\|$ | output admittance | $V_{DS}$ = 15 V<br>$V_{GS}$ = 0<br>f = 1 kHz | - | 50 | µS |
| $C_{iss}$ | input capacitance | $V_{DS}$ = 15 V<br>$V_{GS}$ = 0<br>f = 1 MHz | - | 8 | pF |
| $C_{rss}$ | feedback capacitance | $V_{DS}$ = 15 V<br>$V_{GS}$ = 0<br>f = 1 MHz | - | 4 | pF |



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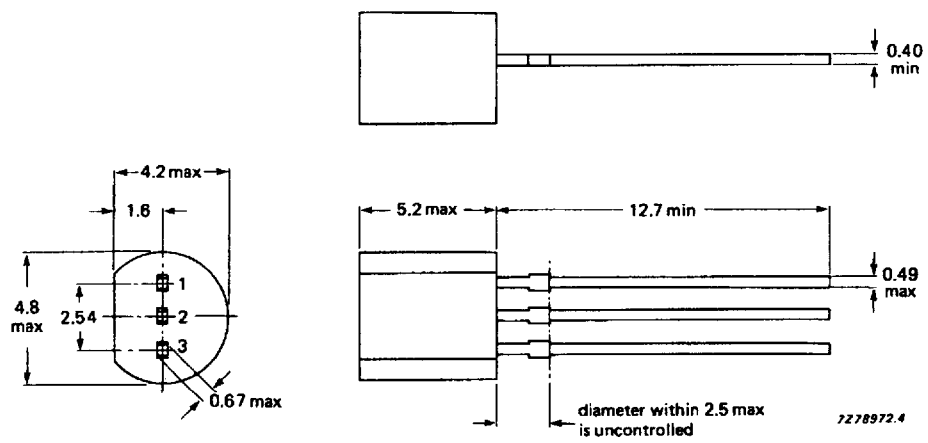
**PACKAGE OUTLINE**




Dimensions in mm

Fig.3 TO-92.



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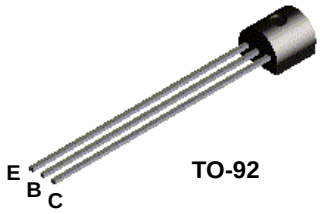
FAIRCHILD SEMICONDUCTOR TM

*Discrete POWER & Signal Technologies*

# TIS97




TO-92

## NPN General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 300 mA. Sourced from Process 10. See PN100 for characteristics.

### Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | 40 | V |
| $V_{CBO}$ | Collector-Base Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 6.0 | V |
| $I_C$ | Collector Current - Continuous | 500 | mA |
| $T_J$, $T_{stg}$ | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

**NOTES**:
**1)** These ratings are based on a maximum junction temperature of 150 degrees C.
**2)** These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | Units |
|---|---|---|---|
| | | TIS97 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 625<br>5.0 | mW<br>mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 83.3 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 200 | °C/W |

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## NPN General Purpose Amplifier
(continued)

### Electrical Characteristics
TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* | $I_C$ = 10 mA, $I_B$ = 0 | 40 | | V |
| $I_{CBO}$ | Collector Cutoff Current | $V_{CB}$ = 40 V, $I_E$ = 0<br>$V_{CB}$ = 60 V, $I_E$ = 0 | | 10<br>10 | nA<br>µA |
| $I_{EBO}$ | Emitter Cutoff Current | $V_{EB}$ = 6.0 V, $I_C$ = 0 | | 20 | nA |
| **ON CHARACTERISTICS*** | | | | | |
| $h_{FE}$ | DC Current Gain | $V_{CE}$ = 5.0 V, $I_C$ = 100 µA | 250 | 700 | |
| $V_{BE(on)}$ | Base-Emitter On Voltage | $V_{CE}$ = 5.0 V, $I_C$ = 100 µA | 0.45 | 0.65 | V |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | |
| $C_{cb}$ | Collector-Base Capacitance | $V_{CB}$ = 5.0 V, f = 1.0 MHz | 1.0 | 4.0 | pF |
| $C_{eb}$ | Emitter-Base Capacitance | $V_{EB}$ = 0.5 V, f = 1.0 MHz | | 16 | pF |
| $h_{fe}$ | Small-Signal Current Gain | $I_C$ = 100 µA, $V_{CE}$ = 5.0 V, f = 1.0 kHz<br>$I_C$ = 10 mA, $V_{CE}$ = 5.0 V, f = 100 MHz | 250<br>2.0 | 800 | |
| NF | Noise Figure | $V_{CE}$ = 5.0 V, $I_C$ = 30 µA, $R_g$ = 10 kΩ, f = 1.0 kHz, $B_W$ = 100 Hz<br>$V_{CE}$ = 5.0 V, $I_C$ = 100 µA, $R_g$ = 10 kΩ, $B_W$ = 15.7 kHz | | 2.0<br>3.0 | dB<br>dB |

*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%