

HENRY/TEMPO C25D02 AND 25D02 TECHNICAL INFORMATION SHEET

CIRCUIT DESCRIPTION

The schematic of the amplifier is shown on the opposite side. The amplifier consists of three distinct boards. An RF sensor and relay circuit, a pre-amplifier stage, and a final power amplifier stage.

In the sensing relay circuit, RF from the antenna to J3 (RF OUT) goes directly through the relay and J1 (RF IN) into the receiver during reception. During transmit the RF from the transceiver enters the amplifier at J1 (RF IN) and causes a DC voltage across diode D1. The voltage is amplified by Q1 to trip relay RY1 causing the signal to enter the amplifier sections. Grounding the base circuit of Q1 disables the sensing circuit to turn the amplifier off. The ring of the three-conductor CONTROL jack (J2) serves this purpose.

In the preamplifier section PB2 (driver stage) the base of Q1 is matched to 50 ohms by C1, C2, C3, L1, and R1. These components form a strip line matching network. A two watt drive signal would be amplified to about 10 watts in this stage.

The output power from PB2 (about 10 watts) is matched to PB3 by C1, C2, & L1. The output power (about 25 watts) is matched to 50 ohms by C4, C5, C6 & C7.

L2 on PB2 and L2 on PB3 serve to decouple the transistors from the DC supply line. D2 is a reverse polarity protection diode. F1 is located externally in the DC line and it is a 3 AG, 8 amp fuse.

FL1 is a 9 pole band-pass filter which is added to the commercial models to reduce spurious emissions to the level specified by the F.C.C.

ALIGNMENT

WARNING: The transistors in these amplifiers are easily damaged if they are shorted. An insulated alignment tool is recommended for all service. The equipment warranty can not extend to damage caused by careless service.

To measure output power, see the schematic and parts diagram on the reverse side. Also see the general information manual for the test set up (Figure 2). Make certain that the drive power from the exciter is between 1 and 5 watts, and that there is a proper 50 ohm dummy load for the output. Drive the amplifier with the exciter at the desired frequency and make the following adjustments.

The 25D02 uses all fixed components and cannot be frequency aligned. The amplifier is factory adjusted by the placement of capacitors to adjust the frequency range of the equipment.

POWER ADJUST

The power input of output of these amplifiers cannot be adjusted.

Input power to the final stage can be calculated by measuring the DC current to the driver stage.

$$\text{Power Input (Watts)} = 13.8 \text{ VDC} \times (\text{total amplifier current} - \text{driver current})$$

CONTROL CONNECTION

A CONTROL jack, provided on each amplifier, allows remote on/off control of the amplifier. As shown in Figure 3 in the general manual, grounding the control line (the ring of the plug), connects the transceiver directly to the antenna.

SPECIFICATIONS

POWER OUTPUT: 20 to 35 watts nominal maximum.

GAIN: Approximately 12 db (16 times drive power).

DRIVE REQUIREMENTS: 1 to 5 watts nominal.

FREQUENCY RANGE: 400 to 512 MHz.

BANDWIDTH: Approximately 10 MHz without retuning.

HARMONIC ATTENUATION: Approximately 70 db below carrier with commercial filtering.

POWER REQUIREMENTS: 13.8 VDC nominal
11 to 15.5 VDC possible, negative ground
5 ma nominal in stand-by
6 amps maximum during transmit.

INPUT-OUTPUT IMPEDANCE: 50 ohms unbalanced.

ANTENNA CHANGEOVER: Automatic built-in RF sensing

DUTY CYCLE: 50% intermittent commercial mobile duty.

TYPE OF EMISSION: FM, Class C operation.

CONNECTORS: RF IN and RF OUT - Type UHF
CONTROL - 3/16" Phone type stereo plug.
13.8 VDC - 2 pin Jone type connector.

MISMATCH PROTECTION: Balanced emitter transistors will withstand infinite VSWR.

CONTROLS: Remote off.

DIMENSIONS: 5.5" long x 4.0" wide x 4.0" high.

WEIGHT: Approximately 3 pounds shipping.
Approximately 1 lb 12 oz unpacked.

NOTE: All rated amplifier outputs are measured under laboratory conditions with a proper drive level. If the amplifiers are operated with improper drive, at a voltage less than 13.8 VDC, with mismatched cables, or with a mismatched antenna the output will be less than maximum!

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PARTS LIST FOR C25D02 AMPLIFIER

PB-1

- C1 2pf mica
- C201 disc
- R1 2.2K ohm .25w
- Q1 2N2222
- RY-1 Guardian 1365 12VDC
- D1 IN4148

PB-2

- C15pf mica chip
- C225pf mica chip
- C315pf mica chip
- C410pf mica chip
- C510pf mica chip
- C610pf mica chip
- C7150pf mica chip
- C801mf ceramic
- C901mf ceramic
- C10 25mf electrolytic
- L1 2 turns of R1 lead
- L23.3 micro H
- R13.3 ohm .5w
- Q1 CM10-12 CTC

PB-3

- C125pf mica chip
- C215pf mica chip
- C435pf mica chip
- C525pf mica chip
- C610pf mica chip
- C7150pf mica chip
- C801mf disc ceramic
- C901mf disc ceramic
- C10 25mf electrolytic
- L11 micro H
- L23.3 micro H
- Q1 CM40-12 CTC

PB-4

- C15pf mica chip
- C225pf mica chip
- C350pf mica chip
- C425pf mica chip
- C550pf mica chip

Main Chassis

- L1 4 turns No. 20
- F1 3ag 10 amp
- J1-J3 UHF type
- J2 3/16" phone jack
- J4 2 pin Jones

TEST DATA

DRIVE POWER

OUTPUT POWER

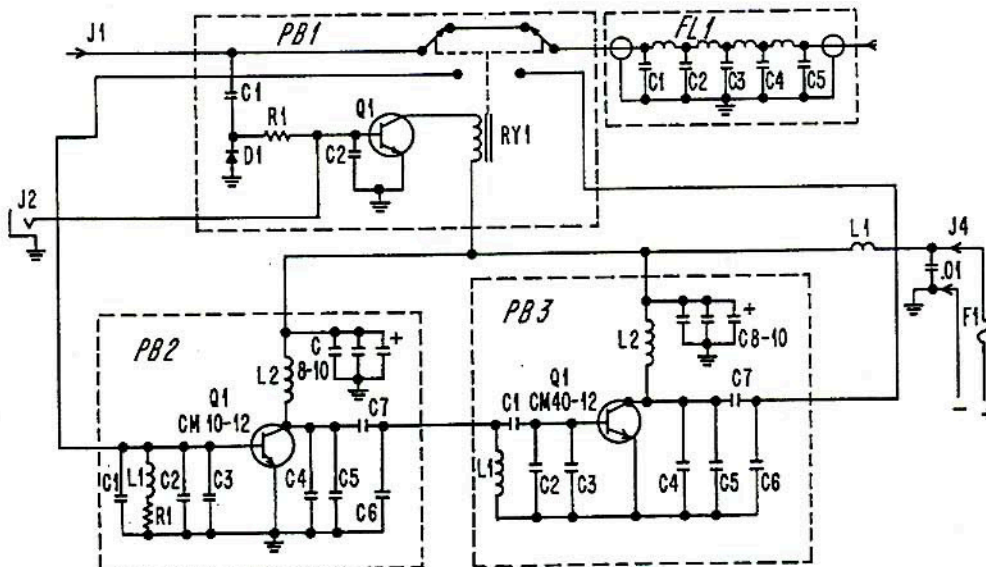
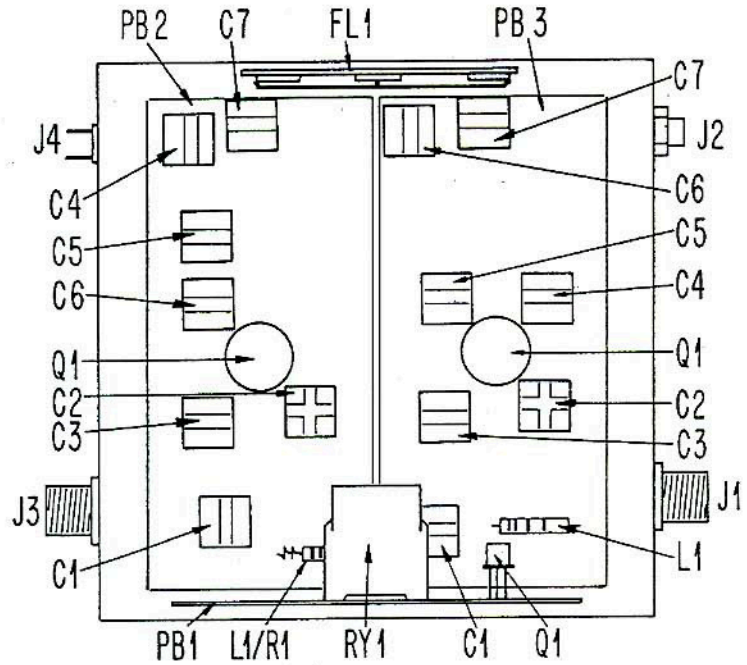
TEST FREQUENCY:

 MHz

All test results were obtained with a power supply voltage of 13.8 VDC, with the amplifier operating into a 50 ohm load.

Date _____

Technician _____



HENRY/TEMPO SOLID STATE AMPLIFIERS GENERAL INFORMATION SHEET

TYPE ACCEPTANCE INFORMATION

With the installation of commercial filtering, these amplifiers are type accepted for operation under all applicable parts of land mobile and fixed base station services. However it is the responsibility of the technician installing and tuning the amplifier to hold the proper class of FCC commercial license and to be familiar with the rules and regulations pertaining to the power output permissible under the class of station license the amplifier is to be used with.

Also, it is extremely important to consult the specifications published by the manufacturer of the exciter. This will insure that the power level which the transceiver will be raised to will not invalidate its full acceptance because of spurious content or frequency stability.

The technician must determine what the maximum power level is in the class of operation he intends to use the amplifier. We suggest that the technician consult the FCC publications regarding the regulations.

For all regulations calling for the measurement of the final input power, consult the sections describing alignment and power adjust on the attached technical sheet. To comply with any regulation regarding low power capability see the section describing the CONTROL connection.

The content of harmonic spurious signal generated by this amplifier is attenuated far in excess of the FCC requirements for the service that the amplifier is type accepted. The attenuation of these spurious signals is guaranteed in the design of the amplifier as well as by the use of a band pass filter on the output of the amplifier.

UNPACKING AND INSTALLATION

The solid state amplifier you have purchased was tested and aligned at the factory for the frequency you requested. Further alignment may be necessary to match the antenna in you installation. Please read the alignment procedure carefully as described on the technical information sheet. Do not try to realign the amplifier unless the output power is below specifications. The solid state devices in your amplifier are easily damaged if they are serviced incorrectly. The equipment warranty can not cover damages caused by negligent service, therefore we recommend that all service be accomplished by a knowledgeable technician.

Remove the amplifier from its shipping box and packing material and examine it for visible damage. If the equipment has been damaged in shipment, save the box and packing material and notify the transportation company immediately. DO NOT put the amplifier into service if it has been damaged.

The following accessories should be included with the amplifier. A drive cable, a DC cable, an instruction manual, a warranty card, and an RF OUT plug. Special cables or connectors can be supplied on request. When installing the amplifier, keep in mind that the equipment should be mounted as closely as possible to the 13.8 VDC power source to prevent low output caused by a voltage drop in

the DC cable. We recommend installation inside the vehicle for mobile installations. The red power lead connects to the battery's positive (+) terminal and the black DC lead connects to the battery's negative (-) terminal. Figure 1 is a diagram of the necessary interconnections.

The DC power cables should be connected directly across the battery to prevent damage to the ignition system of the vehicle caused by the high operating current of the amplifier. Screw the amplifier into position at the location desired and plug the DC power cable into the appropriate connector on the amplifier.

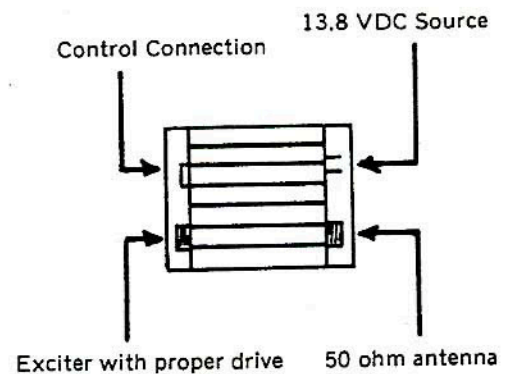
Connect the RF OUT coax connector to an appropriate antenna (50 ohms) using coaxial cable. These amplifiers, as with all solid state devices, operate with maximum output when operating into a 50 ohm load with a low SWR. The SWR of the antenna should be measured and adjusted for a minimum at the desired operating frequency. Also remember that long coax leads cause significant power losses at UHF and VHF frequencies. Connect the supplied drive cable to the exciter and to the RF IN coax connector of the amplifier.

The mobile installation has been completed when all of the described connections have been made.

For base station installations, the amplifier must be connected to a 13.8 VDC source (either a storage battery, or an AC to DC power converter) which is capable of supplying the necessary current.

The amplifiers are designed to key into transmit automatically whenever they are driven with nominal excitation. The CONTROL jack, described on the accompanying sheet, disables the automatic keying circuit for low power operation.

For optimum output, remember that the voltage at the amplifier, the drive power, the length of the coax lead, and proper antenna tuning are all important operating parameters. Complaints of low output can generally be traced to an improper installation.



FOR MAXIMUM OUTPUT POWER

MAXIMIZE YOUR OPERATING PARAMETERS

Figure 1. Installation Diagram.

SERVICE AND REPAIR INFORMATION

Be certain to heed the warnings regarding damage caused by negligent servicing. Be certain to use replacement parts of equal or better ratings when servicing the amplifier.

When ordering replacement or spare parts for your equipment, be sure to specify the model number of the amplifier, the serial number, the schematic number of the part, and a description of the part. This information will aid in fast and correct handling of all parts orders.

Should it become necessary to ship the amplifier to a service center for repair, repack the transceiver in its original carton (or an equivalent box with adequate packing to prevent shipping damage).

After the amplifier has been properly packed, return the equipment to the service center prepaid. Be certain to insure the package for its full value. Also include a short note describing the problems involved. Any amplifier returned for warranty repair should include some proof of the purchase date.

PLEASE NOTE . . . All rated amplifier outputs are measured under laboratory conditions with a proper drive level. If the amplifiers are operated with improper drive, at a voltage less than 13.8 VDC, with mismatched cables, or with a mismatched antenna, the output will be less than maximum.

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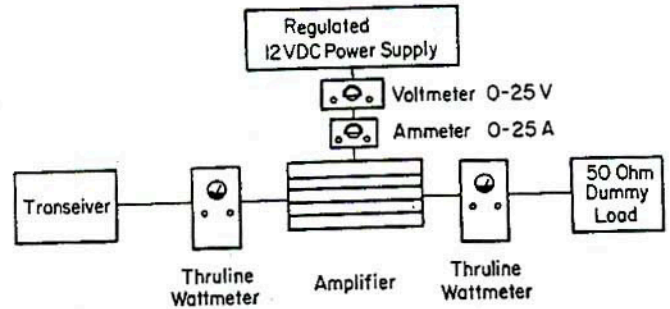


Figure 2. Test Circuit Block Diagram.

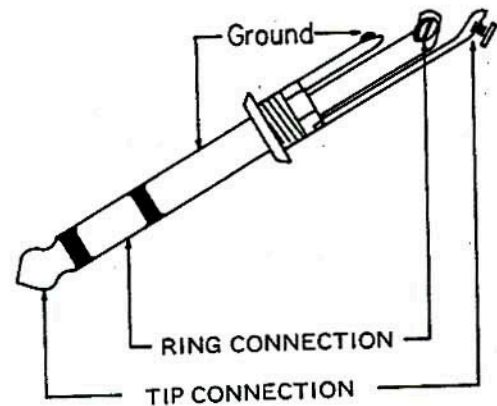


Figure 3. Amplifier Control Plug.

