



# Mobile Communication Equipment



**Low IF Module  
Servicing Information  
3720963-502**

## GENERAL INFORMATION

This instruction book provides servicing information for the Low IF Module used in Series 700 and Series 1000 receivers. The following information is provided

1. Description of circuit operation.
2. Module replacement parts list.
3. Tabulation of Emergency Substitutes for Solid State Devices.
4. Tabulation of Production Variations.
5. Module Assembly and/or Pathfinder Diagram.
6. Module Schematic Diagram.

## CAUTION

Use the radio system internal power supply for testing modules whenever possible. Mobile Transmitter-Receiver units should be supplied from a storage battery and charger to "filter" any undesirable voltage condition. The solid state devices in the modules can be permanently damaged if the full-load to no-load voltage regulation and transients exceed a 20% voltage increase from the specified voltage input rating of the module. The regulation of power supplies may be adversely affected by the presence of strong RF energy, such as that generated by the radio system transmitter.

If a module must be tested outside the radio

system, the preferred power source is a 12 volt storage battery with charger. If a power supply that does not meet or exceed the regulation specifications given above is used for testing, the voltage output of the power supply should be reduced before applying power to the module. After power is applied to the module, the power supply output should be increased to the specified voltage for the modules under test. The voltage output of the power supply should be reduced before power is removed from the module. This procedure must be repeated each time power is applied to or removed from the module.



## DESCRIPTION

### GENERAL

The Low IF Module contains the 455 KHz Amplifier, Limiter, and Discriminator stages, the first three stages of receiver audio amplification, noise squelch and muting circuits, auxiliary audio outputs from the discriminator and preamp, and a regulated 9 Volt supply. Refer to the module schematic diagram while reading the following descriptions.

### IF AMPLIFIERS – Q1/Q2

Q1 and Q2 are wideband Class A 455 KHz IF amplifier stages that supply a high level signal to Limiter/Driver U1. Q2 is protected from overload on strong signals by diode CR2; the diode's conductivity increases in proportion to the voltage across it, shunting a portion of the signal to RF ground. Base bias for Q1 is derived from the voltage developed across Q2 emitter resistor R2. C2 matches the impedance of the input circuit (455 KHz filter) to the base of Q1. Base bias for Q2 is provided by voltage divider R6/R8. L1, in the collector circuit of Q2, limits the IF bandwidth to around 100 KHz.

Part of Q1's output is rectified by CR1 and delivered to pins 39 and 40 as a DC Voltage. The output of Q1 is linear and significant only on stronger signals. This output is available for specialized metering or control applications.

### LIMITER/DRIVER – U1

Integrated circuit U1 provides the limiting function, and amplifies the signal to the level required to drive the discriminator stage. Metering of the RF level at the input of U1 is provided by diode CR3, with R15 serving as a multiplier resistor for a 50 $\mu$ A, 5000 ohm meter. An auxiliary RF output is provided at pin 26 for the carrier detection function, such as used with a COS (Carrier Operated Switch) module.

### DISCRIMINATOR – CR4/CR5

The Discriminator circuit demodulates the frequency modulated signal, producing wide band audio for the squelch and audio circuits. Two metering points are provided for the adjustment of the discriminator transformer, L3. Pin 6 (test point G on the copper track) is the discriminator transformer primary adjustment metering point. Pin 7 (test point H on the copper track) is the discriminator zero adjustment metering point. Both circuits include multiplier resistors for using a 50 $\mu$ A, 5000 ohm meter.

### 455 KHz FILTER

The 455 KHz filter formed by C29/C30/C31/L4 removes undesirable 455 KHz components from the audio signal before it is passed to the other stages.

### DISCRIMINATOR AUDIO OUTPUT – Q17/Q3

Some applications require discriminator grade audio. Part of the discriminator output is fed, via R25 and C34, to emitter follower Q3, which provides a low impedance output. Q17 is used to switch this output on or off. When a control voltage (+12V) is applied to pin 36 or by way of jumper JU3, Q17 provides a low impedance path for the audio signal to ground, disabling the output of Q3.

### COUPLING NETWORK – C35/R31

The coupling circuit of C35/R31 couples the audio output of the discriminator to the AF preamp, Q4/Q5. When an optional Quiet Channel (or other CTCSS) system is used, C35/R31 are removed from the circuit and replaced by an external tone reject filter, which is connected between pins 24 and 25. Pin 24 also serves as the audio output terminal for the Quiet Channel Decoder. C63 is used for high frequency de-emphasis.

### NOISE SQUELCH CIRCUIT – Q10/Q11/Q12/Q13

Transistor Q10, Q11, Q12, and Q13 comprise the Noise operated squelch circuit. Q10 amplifies the wide band noise supplied from the discriminator, and the gain is externally controlled by the Squelch control. The output of Q10 is rectified by Q11. Components L6 and C62 peak the response to noise around 14 KHz, thus avoiding response to speech audio. Q11 output serves as a noise derived control voltage for Schmitt Trigger Q12/Q13. When noise is present (no signal), Q11 emitter voltage, Q12 emitter voltages rises, and Q7/Q8 are biased off, muting receiver audio. When a signal of adequate strength is received, discriminator noise is greatly reduced. Under this condition, virtually no noise is present at Q10 or Q11. Q11 emitter voltage drops, Q12 emitter voltage drops, and Q7 is biased on, permitting Q7 to amplify speech audio. Q13 may also be operated by an external control voltage supplied to pin 29 by an external Quiet Channel Decoder.

### RECEIVER DISABLE (MUTING) – Q16

When a disable or keying voltage is applied to pins 18 or 32, transistor Q16 is biased into conduction.



Diode CR13 clamps the trigger voltage at nine volts to provide a limit for Q16, regardless of variations in the keying voltage. The positive voltage at Q16 emitter triggers squelch gate Q12/Q13 into the tight squelch mode, disabling the receiver. This disables the audio outputs at pins 2 and 38, and provides a keying output at pin 28. When the disable voltage is removed, the charge on capacitors C42 and C50 hold Q16 "on" for an instant. This allows sufficient time for the noise squelch circuitry to mute the receiver, eliminating the "squelch tail."

Jumper JU1 is provided to isolate the receiver disable circuit from the keying voltage during transmit. This feature is necessary to permit the receiver to operate during transmit in a duplex station. The receiver may still be muted with a disable voltage applied to pin 32.

#### SQUELCH DISABLE – Q15

Application of A+ to pin 82 biases Q15 on, dropping its collector voltage to ground, thereby disabling the squelch gate and turning on the receiver audio stages.

#### AF PREAMP – Q4/Q5

Transistors Q4 and Q5 form a direct-coupled audio preamplifier. The output of Q5 is coupled to the external low-level audio control through the BLK, RED, and SHIELD pins of the Low IF Module.

The audio signal undergoes further de-emphasis in the network R41/C66/R43/C44 before being applied to Q7.

#### REPEAT AUDIO OUTPUT – Q6/Q14

For repeater applications, a frequency contoured 600-ohm output is provided. The output of Q5 is applied to emitter-follower Q6, which provides the 600 ohm output at pin 38. Q14 (part of the squelch circuit) switches this output by switching Q4/Q5 on or off.

#### AUDIO AMPLIFIERS – Q7/Q8/Q9

Q7/Q8 form gated audio amplifier stages. The gating voltage is applied to the emitter of the transistor by the squelch and muting circuits (see previous discussions). CR8 provides temperature compensation for the base bias circuit of Q7.

Transistor Q8 serves as a driver for the audio power amplifier module. Feedback from the speaker leads is applied to the stage through Low IF Module pin 1 to reduce distortion.

Q8/Q9 provide outputs at a 180° phase difference for optional circuits requiring a push-pull input.

#### 9 VOLT REGULATOR

The 9 volt regulator circuit, U2, provides a regulated 9 volt source for other modules. L5/C10/C38/C47/C64 filter the input voltage for distribution to other modules.

## PRODUCTION VARIATIONS

The production level of the module is indicated by a legend (example: CODE C) stamped on the module near the identifying drawing number. The following table lists the differences between the various produc-

tion levels. To determine the differences between a given production level and the level shown on the pathfinder, schematic and parts list, note the differences tabulated for the desired level and all subsequent levels.

LOW IF MODULE					
Current Version: 3720963-502 CODE C					
Code Level Differences	Instruction Book References	Changes for Code Level Differences			
A-B	Component Values	Symbol	Stock No.	Drawing No.	Description
		Q10	242758	3468182-001	Transistor
B-C	Component Values	R36	108869	99206-076	15K ohms, 10%, 1/4W



### EMERGENCY SUBSTITUTES — SOLID STATE DEVICES

In the event of a semiconductor failure, the exact replacement found in the replacement parts list should be used. In an emergency, to minimize equipment down-

time, the following common semiconductor types may be temporarily used. However, use of these substitutes may result in degraded system performance.

Component Designation	Emergency Substitutes	Component Designation	Emergency Substitutes
14CR1	use exact replacement	14Q3	2N4123
14CR2	1N914	14Q4	2N4123
14CR3	use exact replacement	14Q5	2N4125
14CR4	1N198A	14Q6	2N4123
14CR5	1N198A	14Q7	2N4123
14CR6	1N914	14Q8	2N5857
14CR7	1N914	14Q9	2N5857
14CR8	1N914	14Q10	2N4124
14CR10	1N914	14Q11	2N4123
14CR11	1N914	14Q12	2N4123
14CR12	1N914	14Q13	2N4125
14CR13	1N914	14Q14	2N4125
14Q1	2N4124	14Q15	2N4123
14Q2	2N4124	14Q16	2N4123
		14Q17	2N4123

### REPLACEMENT PARTS

Symbol	Stock No.	Drawing No.	Description
		3720963-502	LOW IF MODULE P/L 3720963-502 REV 16 CODE C
14C1	227444	3460490-002	CERAMIC, 0.1 UF +80-20% 25 VDC
14C2	105310	1510003-220	390 PF 10% 500 VDC
14C3	227444	3460490-012	CERAMIC, 0.1 UF +80-20% 25 VDC
14C4	234011	1510003-227	1500 PF 10% 500 VDC
14C5	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C6	244528	3460723-331	CERAMIC, 68 PF NPO 5% 100 VDC
14C7	243581	3457537-013	TANTALUM, 10 UF 20% 20 VDC
14C8	227444	3460490-012	CERAMIC, 0.1 UF +80-20% 25 VDC
14C9	228168	3460490-011	CERAMIC, .05 UF +80-20% 25 VDC
14C10	420073	3457537-230	TANTALUM, 47 UF 10% 20 VDC
14C11	227445	3460490-013	CERAMIC, 0.2 UF +80-20% 25 VDC
14C12	420076	3457081-272	MYLAR, 2500 PF 5% 100 VDC
14C13	420076	3457081-272	MYLAR, 2500 PF 5% 100 VDC
14C14	227444	3460490-012	CERAMIC, 0.1 UF +80-20% 25 VDC
14C15	244528	3460723-331	CERAMIC, 68 PF 5% 100 VDC
14C16	242034	3457537-015	TANTALUM, 1.0 UF 35 VDC
14C17	243600	3457537-012	TANTALUM, 4.7 UF 20 VDC
14C18	243581	3457537-013	TANTALUM, 10 UF 20% VDC
14C19	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C20	421902	3457967-613	POLY, 3300 PF 5% 100 VDC
14C21	421903	3457967-616	POLY, 4300 PF 5% 100 VDC
14C22	243600	3457537-012	TANTALUM, 4.7 UF 20 VDC
14C23	421901	3457967-603	POLY, 1200 PF 5% 100 VDC
14C24	218969	8924416-212	1200 PF 2% 500 VDC
14C25	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C26	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C27	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C28	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC

## REPLACEMENT PARTS (continued)

Symbol	Stock No.	Drawing No.	Description
14C29	420075	3457081-121	MYLAR, 5600 PF 10% 100 VDC
14C30	232073	3460723-325	CERAMIC, 30 PF 5% 100 VDC
14C31	112660	1510003-225	.001 UF 10%
14C32	248284	3457081-108	MYLAR, 1800 PF 10% 100 VDC
14C33	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C34	242034	3457537-015	TANTALUM, 1.0 UF 35 VDC
14C35	242742	3457081-139	MYLAR, .033 UF 100 VDC
14C36	243582	3457537-014	TANTALUM, 22 UF 20% 25 VDC
14C37	420491	3457537-125	TANTALUM, 1.0 UF 100 VDC
14C38	420073	3457537-120	TANTALUM, 47 UF 10% 20 VDC
14C39	242034	3457537-015	TANTALUM, 1.0 UF 20% 50 VDC
14C40	234543	3463453-117	DISC, .01 UF +80-20% 25 VDC
14C41	242741	3457081-135	MYLAR, .022 UF 10% 100 VDC
14C42	300653	3457716-104	TANTALUM, 1.0 UF 10% 35 VDC
14C43	242742	3457081-139	MYLAR, .033 UF 10% 100 VDC
14C44	242748	3457081-160	MYLAR, .22 UF 10% 100 VDC
14C45	420073	3457537-120	TANTALUM, 47 UF 10% 100 VDC
14C46	242748	3457081-160	MYLAR, .22 UF 10% 100 VDC
14C47	227419	3453563-113	DISC, 100 UF 15 VDC
14C48	234011	1510003-227	.0015 UF 10% 500 VDC
14C49	420084	3457537-245	TANTALUM, 15 UF 10% 35 VDC
14C50	420083	3457537-129	TANTALUM, 4.7 UF 10% 35 VDC
14C51	227444	3460490-012	0.1 UF +80-20% 25 VDC
14C52	420072	3457537-118	TANTALUM, 10 UF 10% 15 VDC
14C53	300653	3457716-104	TANTALUM, 1.0 UF 10% 35 VDC
14C54	242746	3457081-152	MYLAR, 0.1 UF 10% 100 VDC
14C55	242742	3457081-139	MYLAR, .033 UF 10% 100 VDC
14C56	420081	3457537-123	TANTALUM, 10 UF 10% 25 VDC
14C57	420074	3457537-117	TANTALUM, 6.8 UF 10% 20 VDC
14C58	420082	3457537-128	TANTALUM, 3.3 UF 10% 50 VDC
14C59	420073	3457537-230	TANTALUM, 47 UF 10% 20 VDC
14C60	420072	3457537-118	TANTALUM, 10 UF 10% 15 VDC
14C62	242749	3457081-214	MYLAR, 3000 PF 5% 100 VDC
14C63	421904	3457081-173	MYLAR, 0.15 UF 10% 100 VDC
14C64	420073	3457537-120	TANTALUM, 47 UF 10% 20 VDC
14C65	420073	3457537-120	TANTALUM, 47 UF 10% 20 VDC
14C66	234543	3463453-117	.01 UF +80-20% 25 VDC
14C67	234543	3463453-117	.01 UF +80-20% 25 VDC
14CR1	242248	3467116-002	DIODE
14CR2	242522	3464611-001	DIODE
14CR3	242248	3467116-002	DIODE
14CR4	227448	3460543-001	DIODE
14CR5	227448	3460543-001	DIODE
14CR6	242522	3464611-001	DIODE
14CR7	242522	3464611-001	DIODE
14CR8	242522	3464611-001	DIODE
14CR10	242522	3464611-001	DIODE
14CR11	242522	3464611-001	DIODE
14CR12	242522	3464611-001	DIODE
14CR13	242522	3464611-001	DIODE
14L1	420079	3722327-008	COIL
14L2	242762	3472417-002	COIL
14L3	242763	3472417-003	COIL
14L4	420078	3472327-201	CHOKE, 3.3 MH
14L5	242854	3464596-001	CHOKE, 60 MH FILTER
14L6	231887	3462272-002	CHOKE, 33 MH
14Q1	242759	3468182-002	TRANSISTOR
14Q2	242759	3468182-002	TRANSISTOR
14Q3	242758	3468182-001	TRANSISTOR
14Q4	242758	3468182-001	TRANSISTOR



REPLACEMENT PARTS (continued)

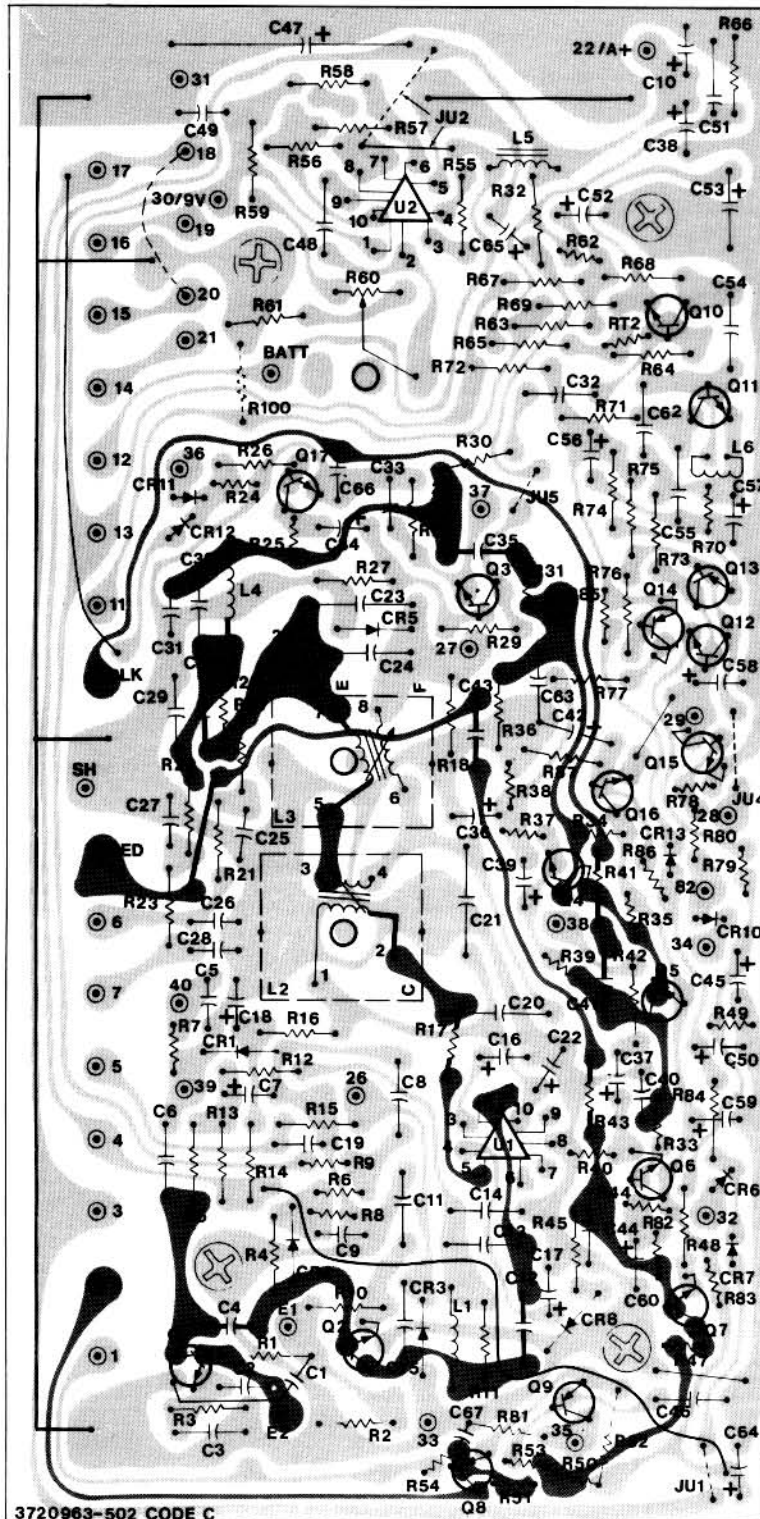
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14Q5	242760	3468183-001	TRANSISTOR
14Q6	242758	3468182-001	TRANSISTOR
14Q7	242758	3468182-001	TRANSISTOR
14Q8	421905	3731418-003	TRANSISTOR
14Q9	421905	3731418-003	TRANSISTOR
14Q10	242759	3468182-002	TRANSISTOR
14Q11	242758	3468182-001	TRANSISTOR
14Q12	242758	3468182-001	TRANSISTOR
14Q13	242760	3468183-001	TRANSISTOR
14Q14	242760	3468183-001	TRANSISTOR
14Q15	242758	3468182-001	TRANSISTOR
14Q16	242758	3468182-001	TRANSISTOR
14Q17	242758	3468182-001	TRANSISTOR
14R1	300739	99206-070	4700 OHMS 10% 1/4 W
14R2	108865	99206-062	1000 OHMS 10% 1/4 W
14R3	108864	99206-058	470 OHMS 10% 1/4 W
14R4	107972	99206-068	3300 OHMS 10% 1/4 W
14R5	108866	99206-066	2200 OHMS 10% 1/4 W
14R6	219467	99206-079	27K OHMS 10% 1/4 W
14R7	300649	99206-083	56K OHMS 10% 1/4 W
14R8	108869	99206-076	15K OHMS 10% 1/4 W
14R9	108865	99206-062	1000 OHMS 10% 1/4 W
14R10	227744	99206-052	150 OHMS 10% 1/4 W
14R11	108865	99206-062	1000 OHMS 10% 1/4 W
14R12	108865	99206-062	1000 OHMS 10% 1/4 W
14R13	108861	99206-050	100 OHMS 10% 1/4 W
14R14	108861	99206-050	100 OHMS 10% 1/4 W
14R15	300649	99206-083	56K OHMS 10% 1/4 W
14R16	108861	99206-050	100 OHMS 10% 1/4 W
14R17	219458	99206-056	330 OHMS 10% 1/4 W
14R18	218499	99206-183	10 K OHMS 5% 1/4 W
14R19	108871	99206-082	47K OHMS 10% 1/4 W
14R20	218499	99206-183	10K OHMS 5% 1/4 W
14R21	285421	99206-078	22K OHMS 10% 1/4 W
14R22	219467	99206-079	27 K OHMS 10% 1/4 W
14R23	285421	99206-078	22K OHMS 10% 1/4 W
14R24	285421	99206-078	22K OHMS 10% 1/4 W
14R25	285421	99206-078	22K OHMS 10% 1/4 W
14R26	285421	99206-078	22K OHMS 10% 1/4 W
14R27	300649	99206-083	56 K OHMS 10% 1/4 W
14R28	107972	99206-068	3300 OHMS 10% 1/4 W
14R29	300649	99206-083	56K OHMS 10% 1/4 W
14R30	108865	99206-062	1000 OHMS 10% 1/4 W
14R31	108869	99206-076	15K OHMS 10% 1/4 W
14R32	108861	99206-050	100 OHMS 10% 1/4 W
14R33	285421	99206-078	22K OHMS 10% 1/4 W
14R34	219467	99206-193	27K OHMS 5% 1/4 W
14R35	300739	99206-070	4700 OHMS 10% 1/4 W
14R36	218499	99206-074	10K OHMS, 10%, 1/4W
14R37	269898	99206-132	75 OHMS 5% 1/4 W
14R38	219459	99206-064	1500 OHMS 10% 1/4 W
14R39	219462	99206-170	3000 OHMS 5% 1/4 W
14R40	108866	99206-066	2200 OHMS 10% 1/4 W
14R41	108867	99206-072	6800 OHMS 10% 1/4 W
14R42	300689	99206-154	620 OHMS 10% 1/4 W
14R43	218499	99206-074	10K OHMS 10% 1/4 W
14R44	285404	99206-195	33 K OHMS 5% 1/4 W
14R45	219464	99206-177	5600 OHMS 5% 1/4 W
14R47	108866	99206-066	2200 OHMS 10% 1/4 W
14R48	233931	99206-123	33 OHMS 5% 1/4 W
14R49	227742	99206-156	750 OHMS 5% 1/4 W



## REPLACEMENT PARTS (continued)

Symbol	Stock No.	Drawing No.	Description
14R50	218760	99206-180	7500 OHMS 5% 1/4 W
14R51	107972	99206-068	3300 OHMS 10% 1/4 W
14R52	922904	99206-144	240 OHMS 5% 1/4 W
14R53	107972	99206-068	3300 OHMS 10% 1/4 W
14R54	108871	99206-082	47K OHMS 10% 1/4 W
14R55	300690	99206-061	820 OHMS 10% 1/4 W
14R56	219466	99206-190	20K OHMS 5% 1/4 W
14R57	300688	99206-152	510 OHMS 5% 1/4 W
14R58	285573	99206-111	10 OHMS 5% 1/4 W
14R59	285442	99206-060	680 OHMS 10% 1/4 W
14R60	236640	3463187-008	VAR. 1000 OHMS 10% 1/4 W
14R61	113524	99206-067	2700 OHMS 10% 1/4 W
14R62	108869	99206-076	15K OHMS 10% 1/4 W
14R63	108869	99206-076	15K OHMS 10% 1/4 W
14R64	108869	99206-076	15K OHMS 10% 1/4 W
14R65	107972	99206-068	3300 OHMS 10% 1/4 W
14R66	300596	99206-176	5100 OHMS 5% 1/4 W
14R67	108861	99206-050	100 OHMS 10% 1/4 W
14R68	107972	99206-068	3300 OHMS 10% 1/4 W
14R69	219459	99206-064	1500 OHMS 10% 1/4 W
14R70	108866	99206-167	2200 OHMS 5% 1/4 W
14R71	285405	99206-069	3900 OHMS 10% 1/4 W
14R72	108861	99206-050	100 OHMS 10% 1/4 W
14R73	219465	99206-181	8200 OHMS 5% 1/4 W
14R74	218500	99206-197	39K OHMS 5% 1/4 W
14R75	113524	99206-169	2700 OHMS 5% 1/4 W
14R76	285404	99206-080	33K OHMS 10% 1/4 W
14R77	108865	99206-062	1000 OHMS 10% 1/4 W
14R78	218499	99206-074	10K OHMS 10% 1/4 W
14R79	108861	99206-050	100 OHMS 10% 1/4 W
14R80	285421	99206-078	22K OHMS 10% 1/4 W
14R81	219458	99206-056	330 OHMS 10% 1/4 W
14R82	285404	99206-195	33K OHMS 5% 1/4 W
14R83	108861	99206-050	100 OHMS 10% 1/4 W
14R84	108865	99206-062	1000 OHMS 10% 1/4 W
14R85	108861	99206-050	100 OHMS 10% 1/4 W
14R86	219467	99206-079	27 K OHMS 10% 1/4 W
14R87	108868	99206-075	12 K OHMS 10% 1/4 W
14RT2	242712	3731172-001	THERMISTOR
14U1	243929	3457697-001	INTEGRATED CIRCUIT
14U2	420077	3720968-002	INTEGRATED CIRCUIT
	228192	3450825-001	PUSH-ON CONNECTOR FOR USE WITH .093" DIAMETER CONTACT PINS (USED ON JUMPER WIRE BETWEEN PINS 18 AND 20) - PACKAGE OF 5
	228194	3450797-003	CONTACT PIN, .093" DIA. (USED FOR CONNECTION PINS OUTSIDE OF THE WIRING CHANNEL) - PACKAGE OF 5
	242732	3457645-002	CONTACT PIN, .04" DIA., (USED FOR PINS 1 THROUGH 17 IN WIRING CHANNEL) - PACKAGE OF 25





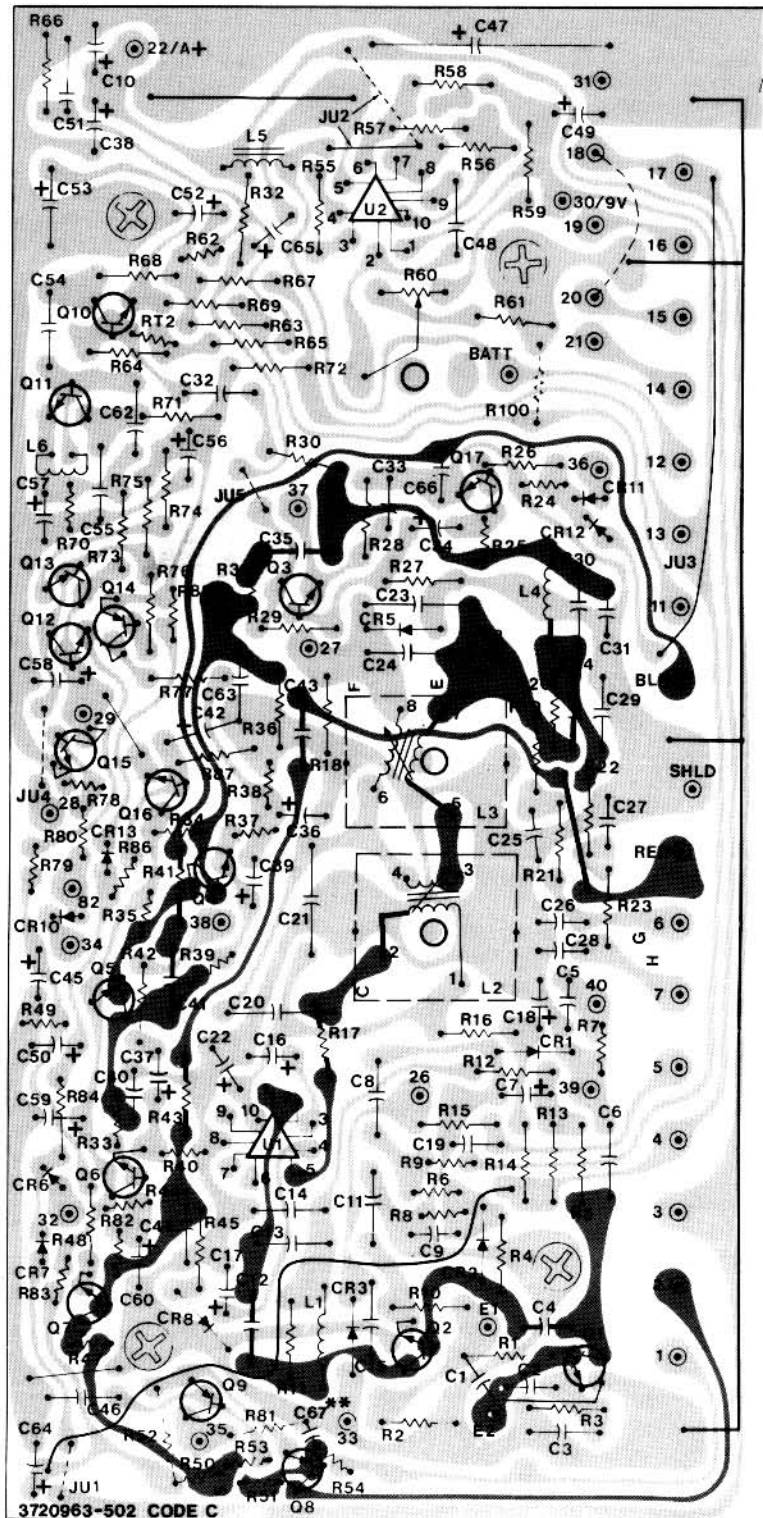
DERIVED FROM  
 3720963 REV 16  
 3457339 REV 27  
 3476439 REV 3

3720963-502 CODE C  
 DARK TONE SIGNAL PATH

3A041

BOARD SHOWN AS VIEWED FROM COMPONENT SIDE

Pathfinder Diagram



DERIVED FROM  
 3720963 REV 16  
 3457339 REV 26  
 3476439 REV 3

3720963-502 CODE C  
 DARK TONE SIGNAL PATH

3A042

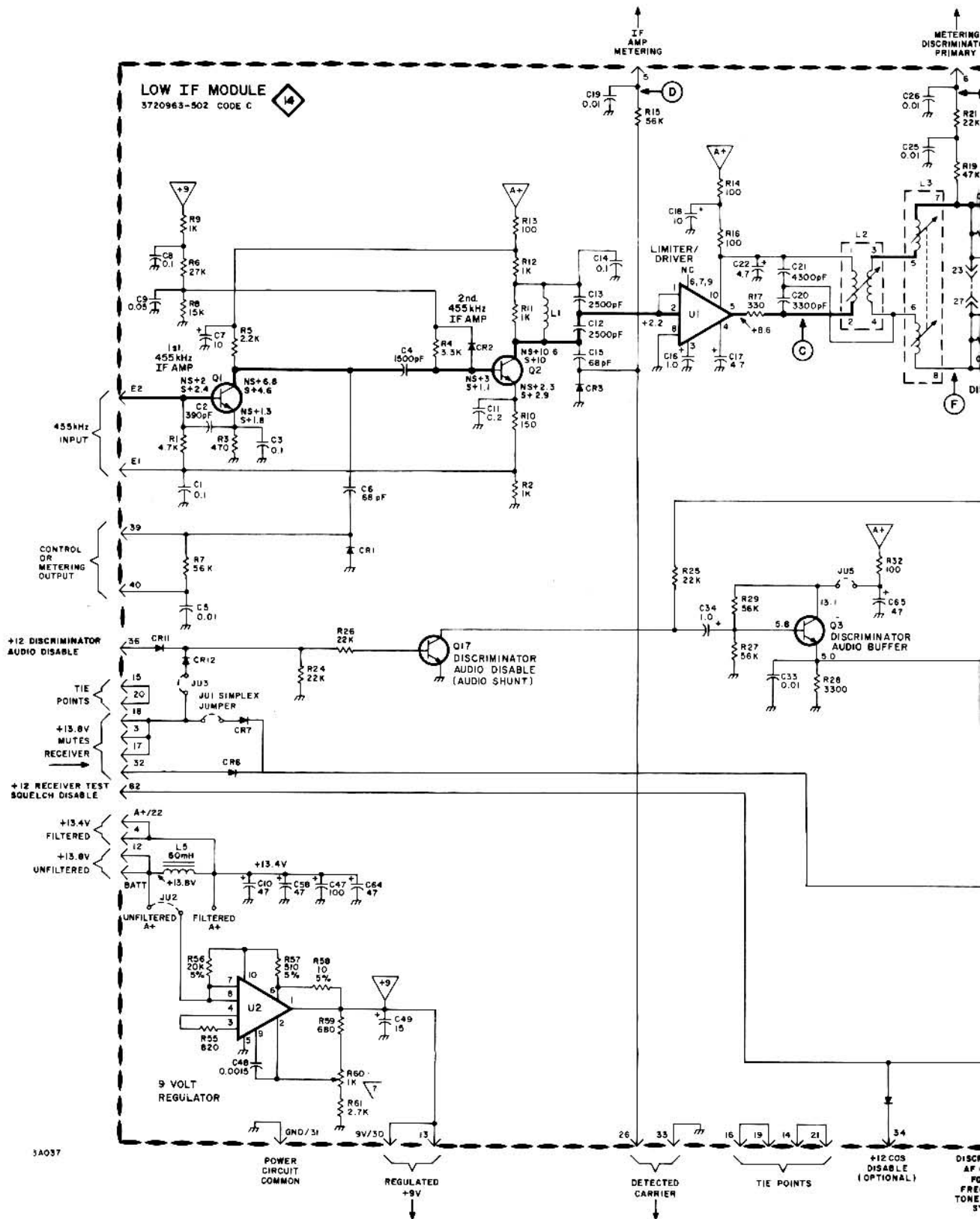
BOARD SHOWN AS VIEWED FROM FOIL SIDE

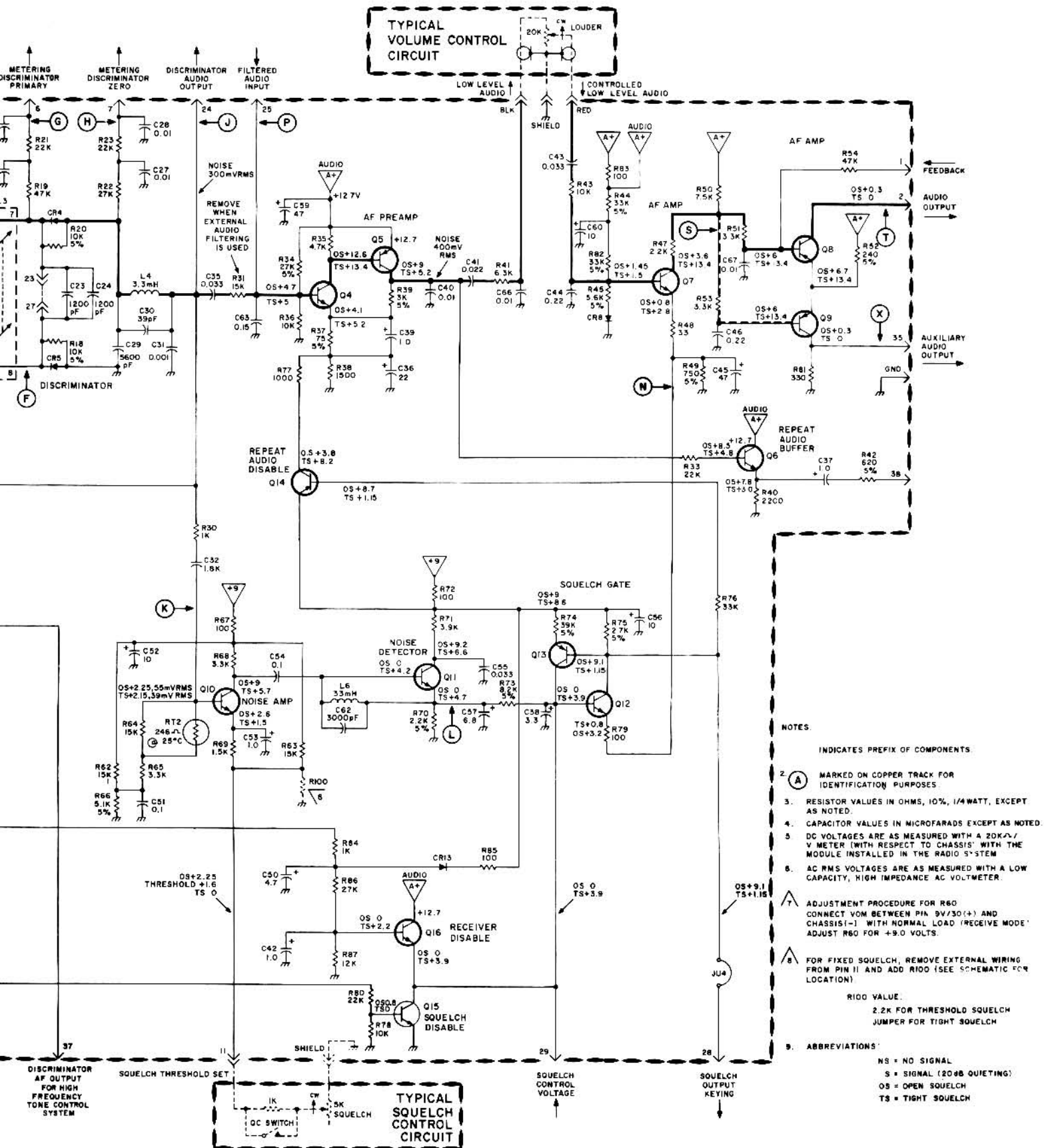
Pathfinder Diagram

N3LKL

14

3720963-502  
LOW IF MODULE

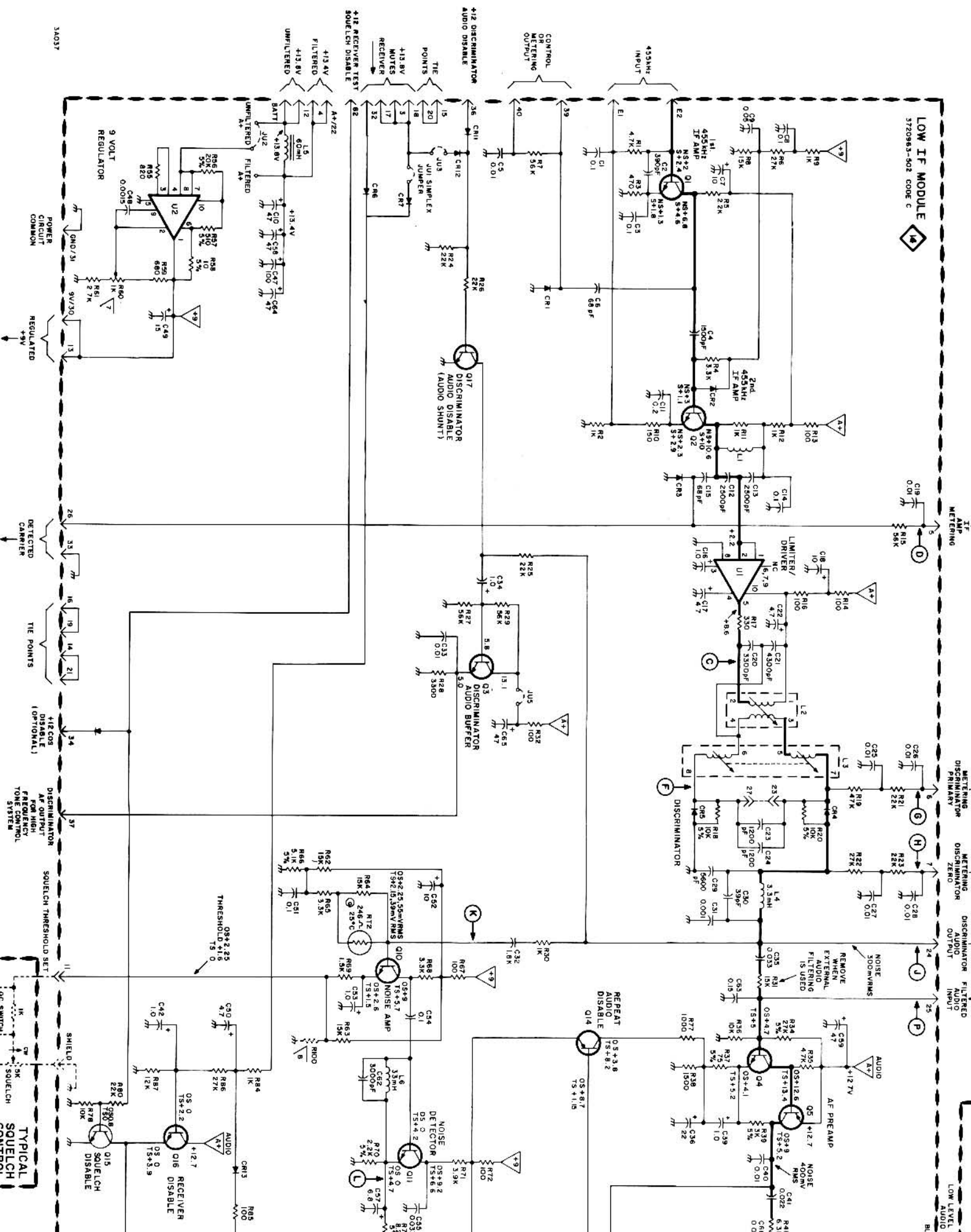




Schematic Diagram

LOW IF MODULE

3720983-502 CODE C

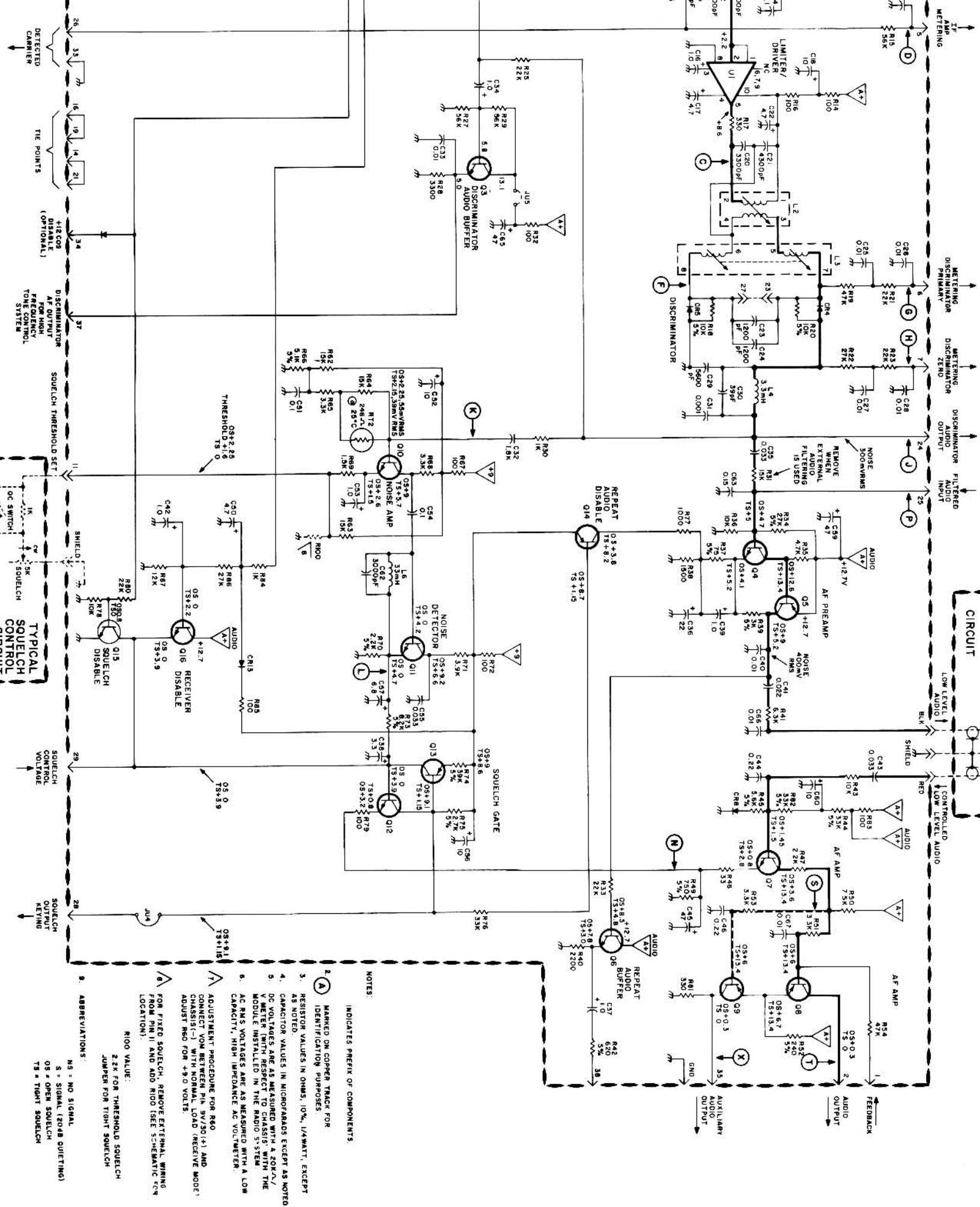


CIRCUIT

LOW LEVEL AUDIO

B.L.K.

3A037



- NOTES:**
- INDICATES PREFIX OF COMPONENTS.
1. MARKED ON COPPER TRACK FOR IDENTIFICATION PURPOSES.
  2. RESISTOR VALUES IN OHMS, 10%, 1/4WATT, EXCEPT AS NOTED.
  3. CAPACITOR VALUES IN MICROFARADS EXCEPT AS NOTED.
  4. DC VOLTAGES ARE AS MEASURED WITH A 20K- $\Omega$  V-METER (WITH RESPECT TO CHASSIS) WITH THE MODULE INSTALLED IN THE RADIO SYSTEM.
  5. AC RMS VOLTAGES ARE AS MEASURED WITH A LOW CAPACITY, HIGH IMPEDANCE AC VOLTMETER.
- ADJUSTMENT PROCEDURE FOR R50:**  
 ADJUST POTENTIOMETER BETWEEN PIN 9V(20(+)) AND CHASSIS(-) WITH NORMAL LOAD (RECEIVE MODE) ADJUST R50 FOR +9.0 VOLTS.
- FOR FIXED SQUELCH:** REMOVE EXTERNAL WIRING FROM PIN II AND ADD R100 (SEE SCHEMATIC FOR LOCATION).
- R100 VALUE:**  
 2.2K FOR TIGHT SQUELCH  
 JUMPER FOR TIGHT SQUELCH
- ABBREVIATIONS:**  
 NS = NO SIGNAL  
 S = SIGNAL (20dB QUIETING)  
 OS = OPEN SQUELCH  
 TS = TIGHT SQUELCH



## ADDENDUM TO IB-8027861

### Low IF Module

### Servicing Information

### 3720963-502

#### 3720963-502 LOW IF MODULE CODE D

This addendum provides information for the Code D production version of the 3720963-502 Low IF Module. Note these changes in IB-8027861, and retain this addendum for future reference.

1. To improve RF bypassing of the push-to-talk line and prevent Quiet Channel Encoder and/or Transmit Time Limiter lockup, C68, a 0.02 mFD Ceramic capacitor has been added to the module between pins 15/20 and ground.

2. To reduce IF regeneration, the following changes have been made:

a. R1 has been changed in value from 4700 ohms, 10% 1/4W, to 560 ohms, 10%, 1/4W.

b. The ground lead of C1 has been moved from the shield lead of Q1 to the ground lead of C9.

#### REPLACEMENT PARTS

Symbol	Stock No.	Drawing No.	Description
	-----	3720963-502	LOW IF MODULE P/L 3720963-502 REV 17 CODE D SAME AS CODE C EXCEPT AS LISTED BELOW
C68	233878	3463453-018	0.02 uFD, +80-20%, 25V
R1	227741	99206-059	560 ohms, 10%, 1/4W