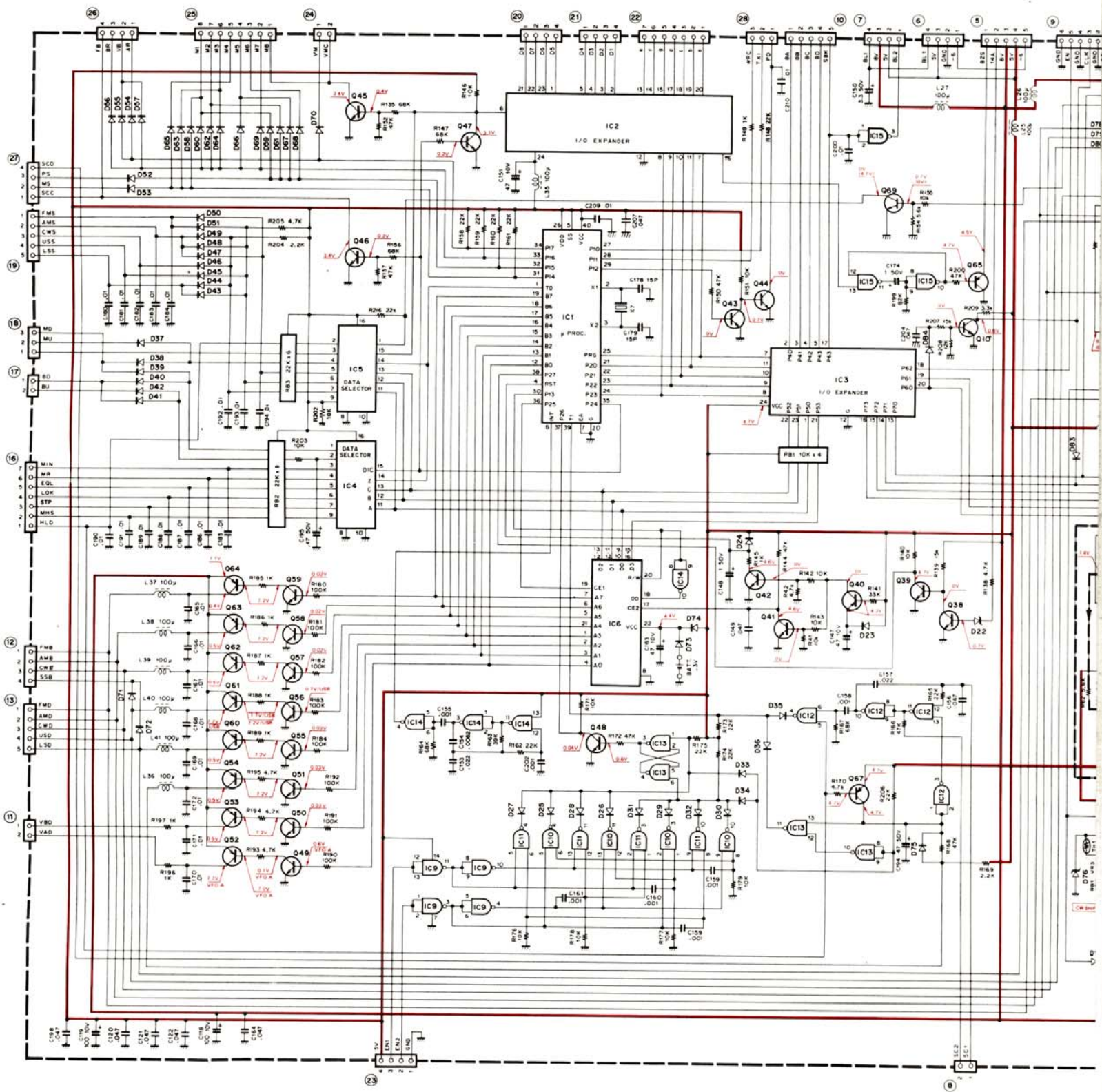


TS-430S Schematic Diagram

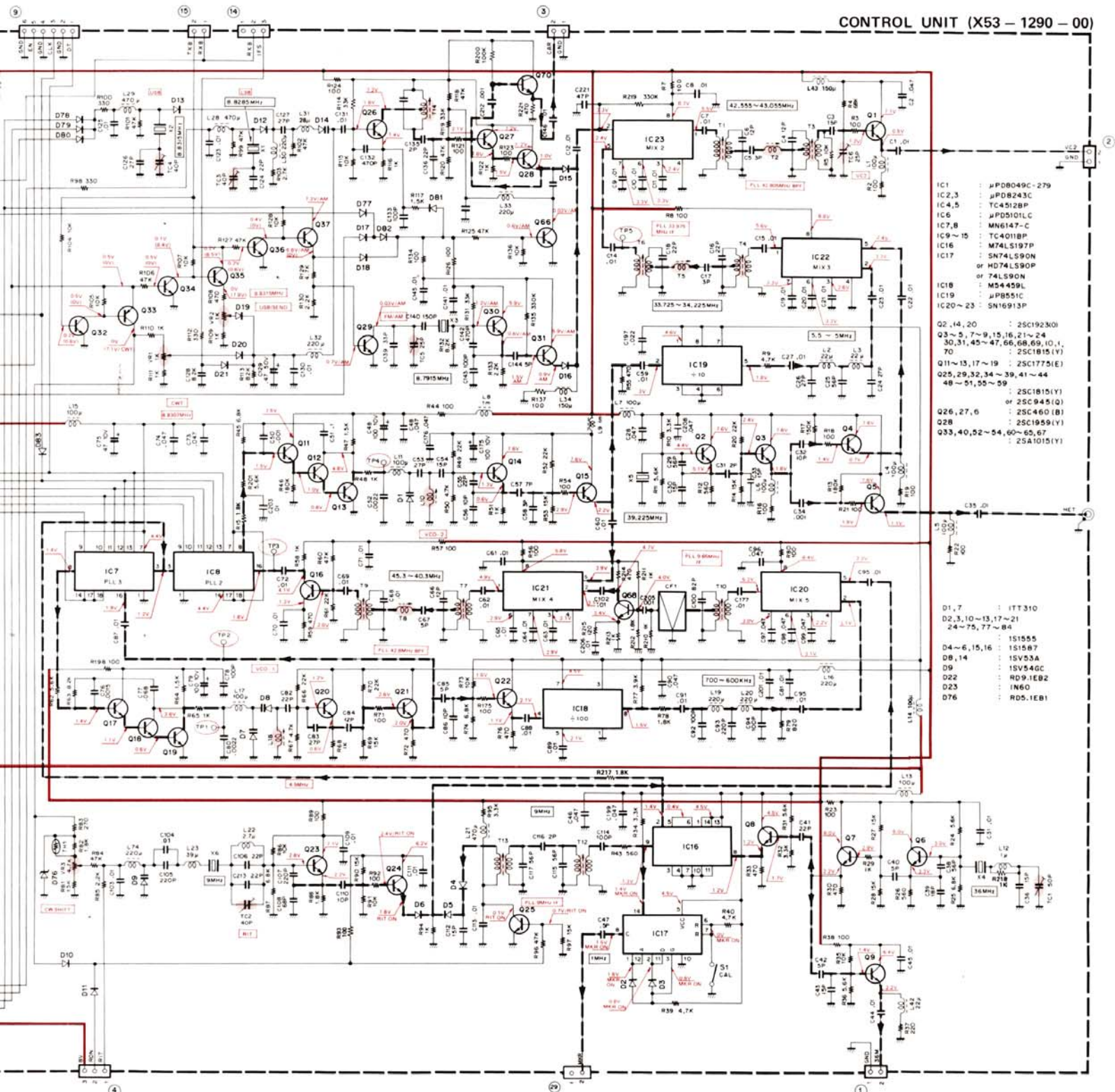


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CIRCUIT DIAGRAM TS-430S

CONTROL UNIT (X53 - 1290 - 00)



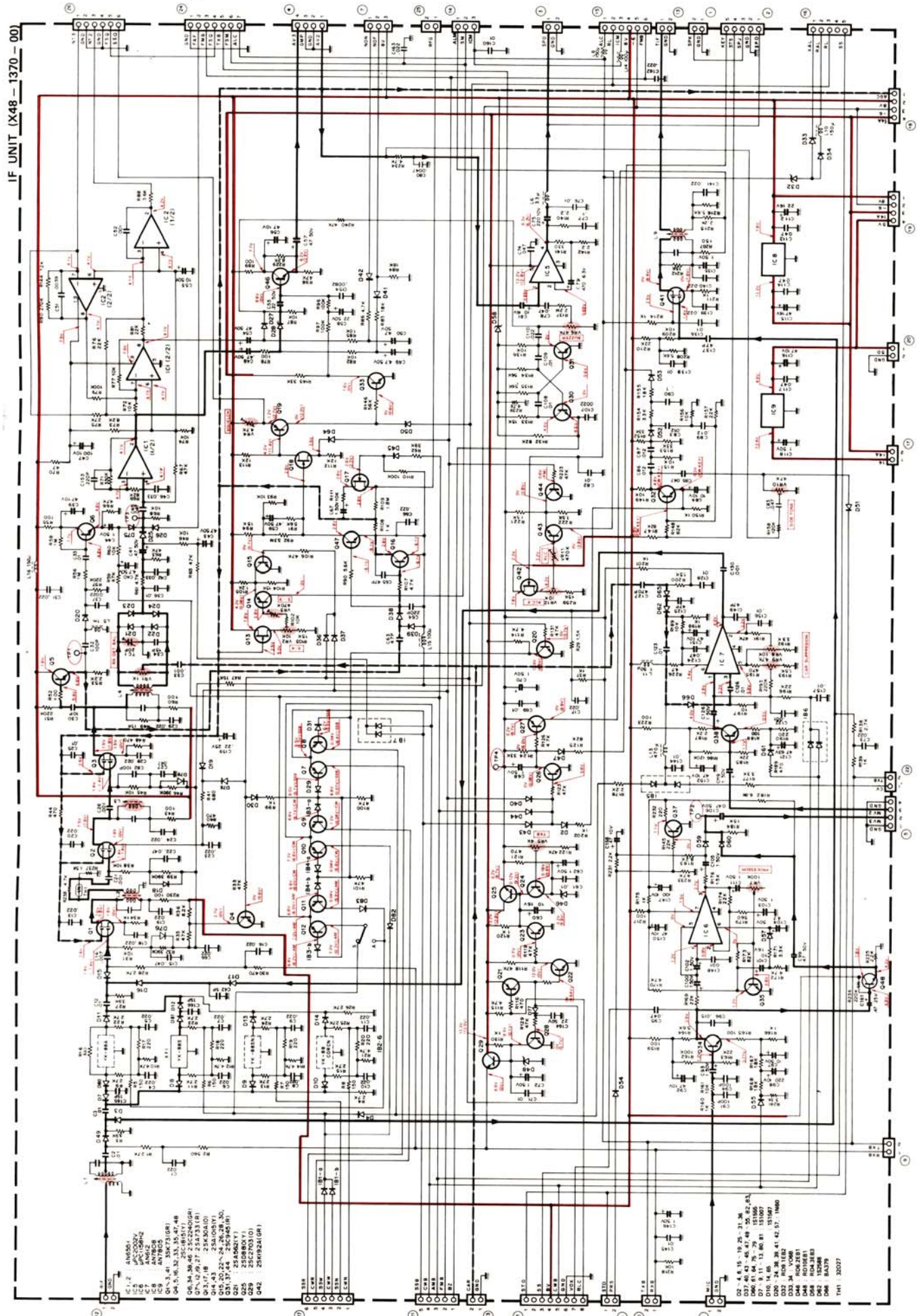
- IC1 : μ PD8049C-279
- IC2,3 : μ PD8243C
- IC4,5 : TC4512BP
- IC6 : μ PD5101LC
- IC7,8 : MN6147-C
- IC9~15 : TC4011BP
- IC16 : M74LS197P
- IC17 : SN74LS90N or HD74LS90P
- IC18 : μ 74LS90N
- IC19 : M54459L
- IC20 : μ PB551C
- IC20~23 : SN16913P

- Q2, 14, 20 : 2SC1923(K)
- Q3~5, 7~9, 15, 16, 21~24, 30, 31, 45~47, 66, 68, 69, 10, 11, 70 : 2SC1815(Y)
- Q11~13, 17~19 : 2SC1775(E)
- Q25, 29, 32, 34~39, 41~44, 48~51, 55~59 : 2SC1815(Y) or 2SC945(Q) or 2SC460(B)
- Q28 : 2SC1959(Y)
- Q33, 40, 52~54, 60~65, 67 : 2SA1015(Y)

- D1, 7 : 1T1310
- D2, 3, 10~13, 17~21, 24~75, 77~84 : 1S1555
- D4~6, 15, 16 : 1S1587
- DB, 14 : 1SV53A
- D9 : 1SV546C
- D22 : RD91EB2
- D23 : 1N60
- D76 : RD51EB1

CIRCUIT DIAGRAM TS-430S

IF UNIT (X48-1370-00)



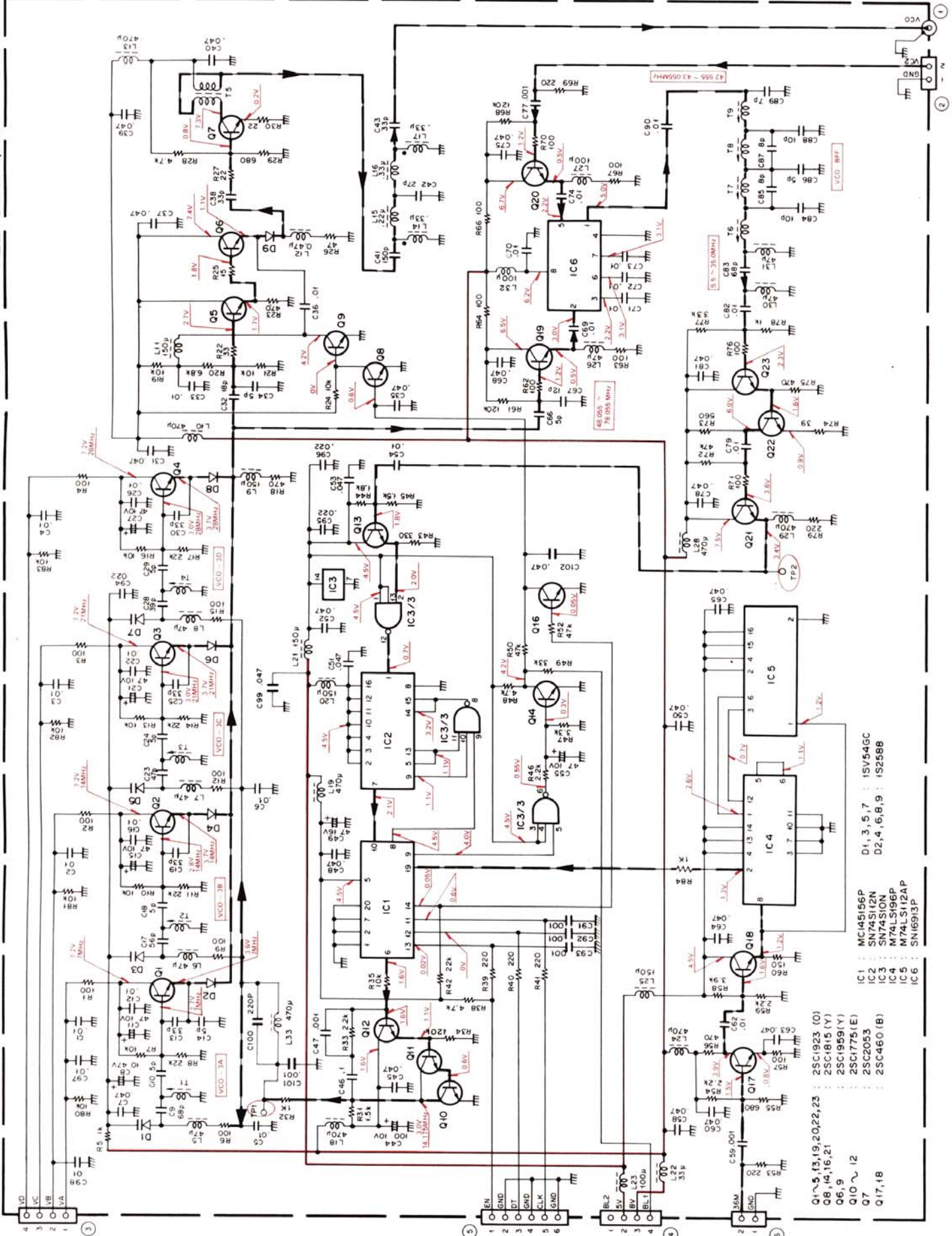
IF UNIT (X48-1370-00)

A B C D E F

CIRCUIT DIAGRAM TS-430S

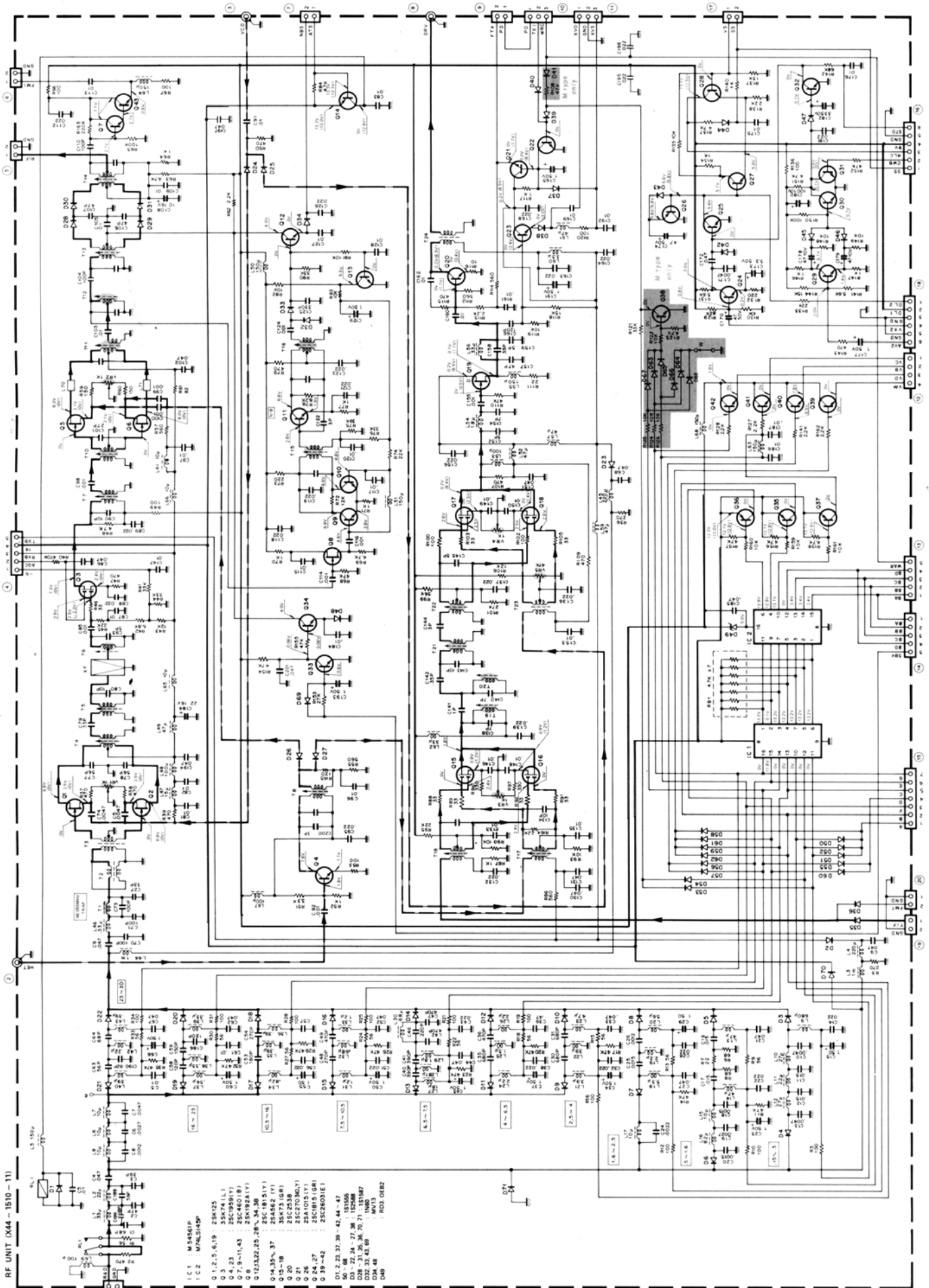
PLL UNIT (X50-1910-00)

PLL UNIT (X50-1910-00)



- IC1 : MC145156P
- IC2 : SN74S12N
- IC3 : SN74S10N
- IC4 : M74LS196P
- IC5 : M74LS122AP
- IC6 : SN16913P
- D1,3,5,7 : 1SV54GC
- D2,4,6,8,9 : 1S2588

- O1~5,13,19,20,22,23 : 25C1923 (O)
- O6,14,16,21 : 25C4815 (Y)
- O6,9 : 25C1959(Y)
- O10 ~ 12 : 25C1775(E)
- O7 : 25C2053
- O17,18 : 25C460 (B)



- RF UNIT (X44-1510-11)
- | | |
|---|--------------|
| IC1 | M 54561P |
| IC2 | M76L5145P |
| 0.1, 2, 3, 6, 19 | 25K125 |
| 0.3 | 35K74 (L) |
| 0.4, 23 | 25C1950(Y) |
| 0.5, 8, 9, 11, 43 | 25K192A (Y) |
| 0.12, 32, 25, 28, 34, 38 | 25C1815 (Y) |
| 0.14, 35, 37 | 25C1815 (Y) |
| 0.15, 10 | 25K191 (Y) |
| 0.20 | 25C2538 |
| 0.21 | 25C270 (MAY) |
| 0.28 | 25K1015 (Y) |
| 0.28, 37 | 25C1815 (Y) |
| 0.39-42 | 25C2603 (E) |
| 50, 51, 52, 53, 59-62, 64, 67 | 50K |
| 63, 64, 65, 66, 67, 68 | 152K68 |
| 69, 70, 71, 72, 73, 74, 75, 76, 77 | 100K1567 |
| 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 | 100K |
| 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200 | 100K |
| 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300 | 100K |
| 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400 | 100K |
| 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500 | 100K |
| 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600 | 100K |
| 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700 | 100K |
| 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800 | 100K |
| 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900 | 100K |
| 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000 | 100K |

CIRCUIT DESCRIPTION

OVERVIEW

The TS-430 is a transceiver and general-coverage receiver featuring double conversion at 48.055 and 8.830MHz intermediate-frequencies. Triple-conversion to 455kHz is used during FM receive operation. A microprocessor based 10Hz or 100Hz step switchable digital VFO system is employed for frequency control. The PLL system reference

is a 36MHz master oscillator.

The following features are provided with the TS-430 : dual digital VFOs, 8 memory channels, memory scan, programmable band scan, IF shift, RIT, VOX, CW side tone, speech processor, NB, AF notch, squelch, F step, F lock, Mic UP/DWN.

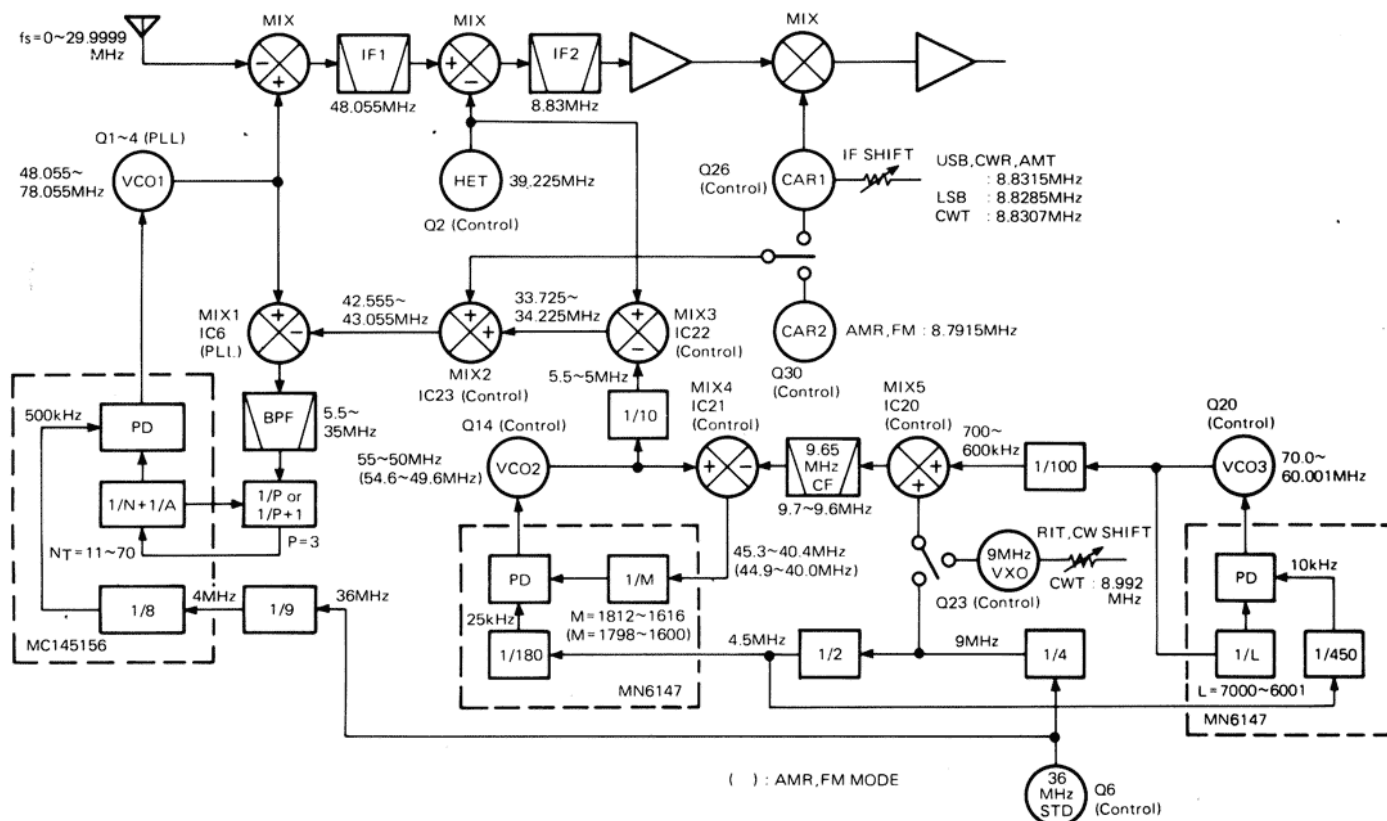


Fig. 1 Frequency configuration

RECEIVER CONFIGURATION

The TS-430 uses a double conversion receiver with a 48.055 MHz 1st intermediate frequency and 8.830MHz 2nd IF for SSB, CW, and AM modes. Triple conversion is used for the FM mode, in which the 3rd IF is 455kHz.

A signal from the antenna passes through one of seven LPF (Low Pass Filters) on the LPF unit, the antenna relay RL1, and enters the RF unit RA terminal. It then passes through the 20dB ATT (ATTENUATOR), controlled by Q14, a 30MHz LPF, the LPF for each band (a combination HPF and LPF for the 0.5 through 1.6MHz band), and the final LPF. The signal is then converted from an unbalanced to a balanced signal by broad-band transformer T2, and is mixed at Q1 & Q2 (JFET's) with the local oscillator signal from the PLL to arrive at the 48.055kHz 1st IF.

The signal passes through the MCF (Monolithic Crystal Filter), is post-amplified by Q3 (3SK74) and mixed at Q5, Q6 (2SK125), the 2nd balanced mixer with the 39.225MHz HET (Heterodyne) signal from the PLL to provide the 8.830MHz 2nd IF. A sample of the signal is picked off

and amplified by the NB (Noise Blanker) chain (Q8-Q13). The main portion of this 2nd IF signal passes through the NB gate (D28-D31). The NB is also triggered by Q33, Q34 from a pulse signal supplies off the Control unit at PLL reset. This suppresses the "click" normally heard when one of the PLL loops resets. The signal is then fed to two outputs : one for the SSB, AM and CW modes, which is supplied to the IF unit, and the other, which is amplified by Darlington Pair Q7, Q43 and supplied to the (optional) FM unit. The signal supplied to the IF unit first passes through the MCF for the selected mode and is then amplified by three stages of IF amplification Q1-Q3 (3SK73 x 3). In the SSB and CW modes, the signal from the amplifiers is detected by the product detector D21-D24 (1N60 x 4).

The audio signal in any mode passes through the notch filter IC1 and IC2 (AN6551 x 2) and then the squelch-switching transistor Q46 (2SC2240) ; the output of the transistor is supplied to the AF GAIN control. Q47, Q18, Q19 and Q33 are the squelch control chain for all modes but FM. In the AM mode circuit, the IF output is ampli-

CIRCUIT DESCRIPTION

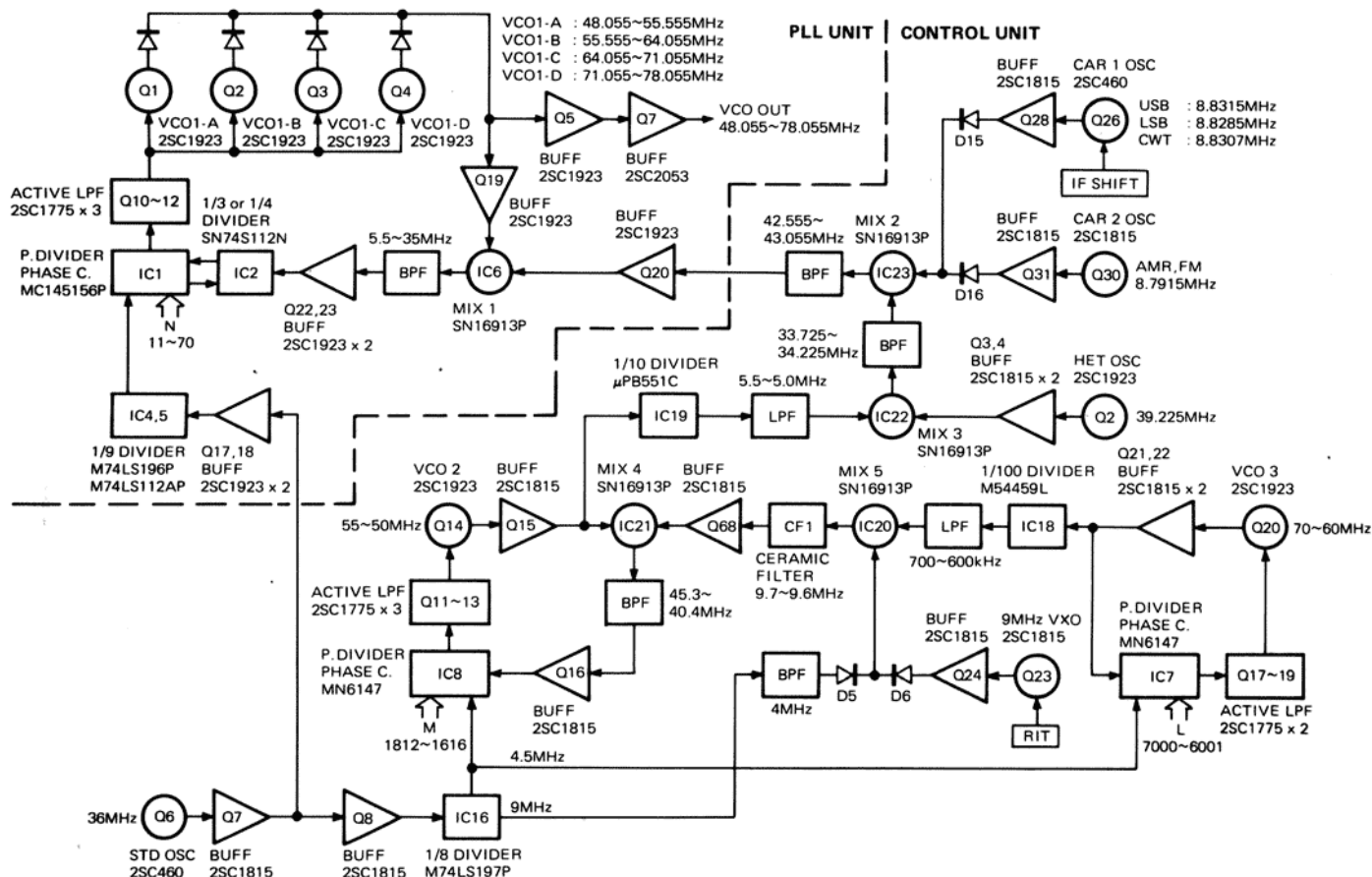


Fig. 3 PLL Block diagram

DIGITAL CONTROL CIRCUIT

The TS-430 digital Control unit consists of a μ PD8049C-279 8-bit microcomputer (IC1), 2 I/O expanders, 2 data selectors, a C-MOS RAM IC for memory and a diode matrix for interfacing.

The MODE SW, BAND SW, M-IN, MR, A=B, HOLD, STEP, MIC UP/DOWN and LOCK switches are connected to the data selectors (IC4 and IC5 : TC4512BP) either directly or through the diode matrix so that the setting of each switch is input to the microcomputer as 1 data bit. The FUNCTION, MEMORY CH, MS and PG.S SW switches are also connected to the microcomputer through the diode matrix. Thus, the settings of these switches are input to the microcomputer as 4 data bits.

I/O expander IC3 (μ PD8243C) is used to output the frequency division data for the PLLs and the band data. The frequency division data is changed only when the frequency is changed. The frequency range from 0 to 30MHz is divided into 10 band segments, and these segments are selected by band data which is output as 4-bit BCD code. The other I/O expander (IC2) outputs frequency data for the 7-segment display and the digit dynamic drive signal. The clock signal used to dynamically drive the display is generated by astable multivibrator IC14 (TC4011BP), which oscillates at approximately 1kHz.

The encoder interface circuit (consisting of IC9, IC10 and IC11 [TC4011BPs]) multiplies the 250 pulses/rev. 2-phase clock signal generated by the encoder unit by 4 to obtain a 1000 pulses/rev. clock signal which is applied to the microcomputer. The relationship between the phases is detected by IC13 to determine the tuning knob direction of rotation, and this directional data is applied to the microcomputer as the UP/DOWN signal.

The microcomputer clock signal input terminal is also used to input the speed control data for program scan. A clock signal generated by astable multivibrator IC12 (TC4011BP) is applied to this terminal in the program scan mode. The frequency of this multivibrator can be varied from 50 to 250Hz by the slide potentiometer located on the top panel.

The memory backup circuit uses a C-MOS RAM (IC6 : μ PD5101LC) and a 3V lithium battery. The microcomputer monitors the main power supply voltage using a circuit consisting of D22 (RD9.1EB2) Q38 and Q39 (2SC1815s). When the voltage (normally 13.8V DC) drops below about 9.5V, the microcomputer stops normal operation and starts transferring frequency data to the backup RAM (IC6 : μ PD5101LC). The microcomputer then detects a drops in the 5V line voltage and sets the RAM in the standby (or backup) state. Current consumption during backup is approximately 0.1 μ A (typ.), and the