

THE ST-600 (MR. RTTY) TERMINAL UNIT COMES IN AN ATTRACTIVE GREY AND BLACK CABINET AND FEATURES 170HZ SHIFT, A BAND PASS INPUT FILTER, LIMITER, SHARPLY TUNED MARK-SPACE FILTERS, FULL WAVE DETECTION, ACTIVE LOW PASS BUTTERWORTH FILTER, AUTOMATIC THRESHOLD CORRECTION CIRCUIT, FLOATING LOOP SUPPLY, REGULATED PLUS-MINUS 12 VOLT POWER SUPPLIES, ANTI-SPACE, AUTO-START, RECEIVE- STANDBY LED INDICATORS. A TUNING METER AND MARK-SPACE LED INDICATORS AND AFSK USING THE EXAR 2206.

Introduction To The Fantastic "Mr. RTTY"

Mr. RTTY, the ST-600 Demodulator is similar to the ST-6. It is all solid state, using a 709 operational amplifier in the limiter and dual operational amplifiers in addition to other transistor devices.

FEATURES

Mr. RTTY has an outstanding limiter, bandpass input filter, a linear discriminator, full wave detection, a 3-pole active low-pass butterworth filter, a threshold corrector circuit, a high gain slicer, a high voltage loop keyer transistor, anti-space, auto-start, floating loop supply, regulated plus and minus power supply, tuning meter and standby-receive lamp indicators. Also Mr. RTTY has the AK-2 AFSK built into the same cabinet.

CIRCUIT DESCRIPTION

The bandpass input filter is a 3 pole butterworth that is tuned to a center frequency of 2195 Hz and is about 270 Hz wide at the -3DB point.

The Limiter is a 709 operational amplifier running "open loop" for maximum gain. When turned off it becomes a linear amplifier at normal input levels and reverts to a controlled limiter if the input exceeds the normal level.

DISCRIMINATOR

The discriminator uses standard 88 Mh toroid inductors and one is tuned to 2125 Hz mark and the other to 2295 space. Both filters are around 60-70 Hz wide at the -3 DB point.

THE DETECTOR

Full-Wave detection is used for optimum detection and easiest filtering of the remaining ripple component. An additional detector is incorporated to drive the tuning meter and auto-start control.

THE LOWPASS FILTER

The lowpass filter is an active 3 pole butterworth filter and does a good job of improving the performance of the demodulator and is constructed to receive 60 thru 100 wpm and uses a dual operational amplifier.

THE ATC THRESHOLD CORRECTOR

This circuit provides the symmetry needed for the slicer to minimize distortion when using limiterless operation. It also enables mark-only or space-only reception.

SLICER

The slicer uses one half of a dual operational amplifier running open loop for maximum gain.

THE ANTI-SPACE

The anti-space circuit samples the mark-space output of the slicer. If the signal goes to space for more than 132Ms the system locks the printer to mark-hold and at the same time turns off the motor control circuits starting the timing to turn off the printer.

TUNING METER

The tuning meter shows the operator when he has the signal tuned in. It will be noted that there will be 2 peaks on the meter when tuning across a signal. The correct peak will turn on the printer and start copying the signal in about 1 to 2 seconds. The incorrect peak will not turn on the printer and no copy will be received.

THE AUTO-START CIRCUIT

This is a unique squelch system that responds only to RTTY or a steady mark signal. It samples both the mark and space channels for a signal having a duty time in excess of about 70% and will turn on in about 1 to 2 seconds when a valid RTTY signal is received; turn on time in the slow position is 5 to 6 seconds.

MOTOR DELAY

The printer will turn off in about 45 to 60 seconds when the signal is off and will turn back on when a signal is received.

LOOP SUPPLY

The loop supply is of the floating type and is set for 60 Ma. operation. When the motor circuit turns the printer off it also opens the loop so that excessive power is not wasted.

LOW VOLTAGE SUPPLIES

The low voltage supplies uses plus and minus voltage regulator.

STANDBY-RECEIVE LAMPS

The standby-receive lamps give the operator an indication of the status of the terminal unit whether it be in receive mode or standby. When the standby switch is in the standby position, both lamps will light, indicating the unit is in standby mode.

THE SWITCHES

The limiter switch is a dual-purpose switch that turns the limiter off and at the same time turns off the auto-start.

The normal-reverse switch is for copying signals that have a downward shift. Normal operation is an upward shift of the mark space tones and on occasions a station can be found that is operating this way.

The standby-receive switch places the printer in the markhold and keeps it on. There is also a jack on the rear panel for a remote switch so that a remote standby switch can be added to place Mr. RTTY in the standby mode when you are transmitting. (Mr. RTTY has to be in a standby when transmitting)

The fast-slow switch in the fast position turns on the auto-start in 1 to 2 seconds and is normally used in this position. The slow position takes 5-6 seconds to turn on the auto-start and can be used for normal operation but works better to use the slow position for unattended operation.

The auto-start on-off switch merely turns the auto-start off. At times on weak signals it will help to turn the auto-start off and still keep the limiter on.

REAR PANEL CONNECTIONS

Audio input—this is the connection for the receiver audio to be fed into Mr. RTTY and the input impedance is 8 OHMS. Input level to Mr. RTTY can be from .2 to as high as 10 volts of audio.

REMOTE STANDBY SWITCH JACK

This connector is for a remote standby switch, so that a DPST switch can be used to put Mr. RTTY in the standby mode and at the same time key a transmitter, thus allowing one switch operation of the station.

LOOP JACK—CAUTION

This jack provides the 60MA that is necessary for the printer selector magnets and is insulated from the chassis and has around 185 volts DC on it and caution should be observed when connecting the machine to this jack.

AC RECEPTACLE

This jack is for the printer motor so that Mr. RTTY will turn the printer off when no signal is received and keep the printer from running "open" when the auto-start times out.

AFSK OUTPUT

This is the output of the AFSK to be fed into the microphone circuit of the transmitter and the output level is adjustable.

MARK OUTPUT

To scope for tuning.

SPACE OUTPUTS

To scope for tuning.

KEY

This jack is for a key to provide the required CW identification when transmitting RTTY.

OPERATING INSTRUCTIONS

It is a good idea to have all the equipment used in the RTTY station, be it VHF-FM or high frequency to be grounded together and to a good outside ground.

For normal operation of Mr. RTTY all switches would be in the "up" position, with the exception of unattended operation where the auto-start fast-slow switch would then be in the down position (slow).

When tuning in a signal, tune the meter to max and after a second or two the receive lamp will come on and the printer will start printing. If it doesn't come on, then tune to the other peak on the meter. On crystal control operation on two meter FM no tuning is required if the station is transmitting the correct tones. On weak signal reception the operator can try turning either the auto-start or the limiter off and use whichever one gives him the desired good copy.

Signals can be copied well, that have a lot of fading on them or are weak.

For best operation on the high frequency bands it is best to use the AGC of the receiver in the fastest position to help in copy, if the receiver has adjustable AGC.

During reception the audio of the receiver can be turned down to a low level and not hurt the ability of Mr. RTTY to copy weak signals or the speaker can be turned off if the operator desires.

If you have a separate transmitter-receiver that is capable of transceiving you can check the mark frequency by not muting the receiver while you have the transmitter in transmit while feeding the AFSK output into the transmitter.

Doing this, the meter on Mr. RTTY should be at it's peak and if not then the mark adjustment pot (R-93) can be adjusted to where the meter does peak. Open the loop circuit and tune (R-94) until the meter peaks.

The AFSK is quite stable and will give many hours of operation but as with all oscillators using timing capacitors it will move frequency over a period of time so the mark frequency would then have to be readjusted but still the correct shift of 170Hz would be maintained.

LIMITED WARRANTY

This Radio Wholesale product is unconditionally guaranteed for a period of one year against defective materials, workmanship and normal wear.

Warranty applies only to original owner of unit and may not be transferred to a third party.

Improper installation or unauthorized servicing automatically voids our warranty.

Radio Wholesale will repair or replace at our option any part or component at no charge to the original owner.

Radio Wholesale does not warrant units that are abused, damaged through negligence, missuse or submerged. Original owner is responsible for periodic cleaning as necessary to prevent corrosion by salt water or any other substance which damages units.

The Manufacturer, Radio Wholesale, Columbus, Georgia, U.S.A.
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Radio Wholesale

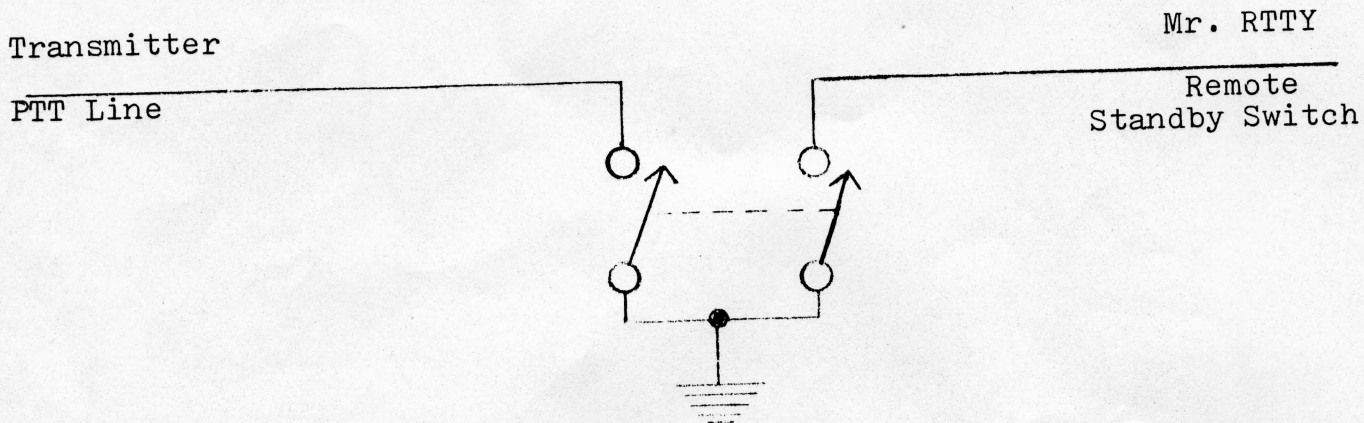
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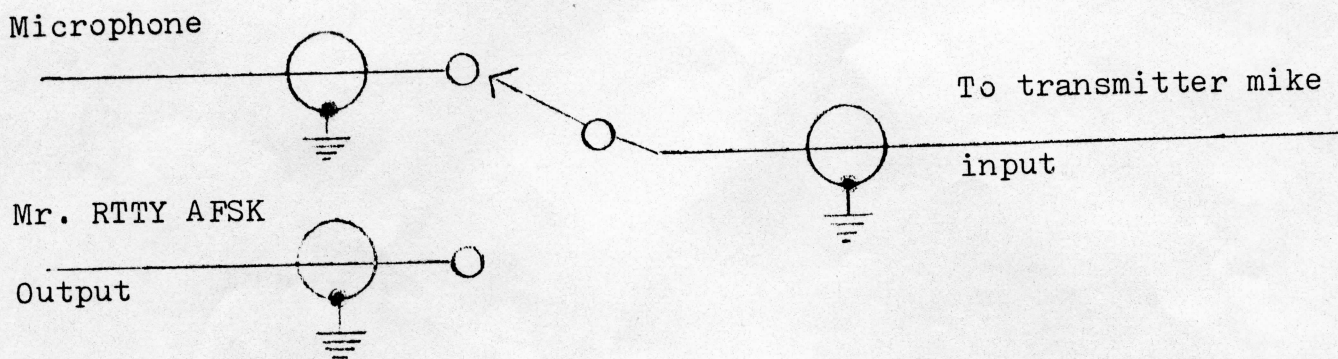
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Bill Gonder

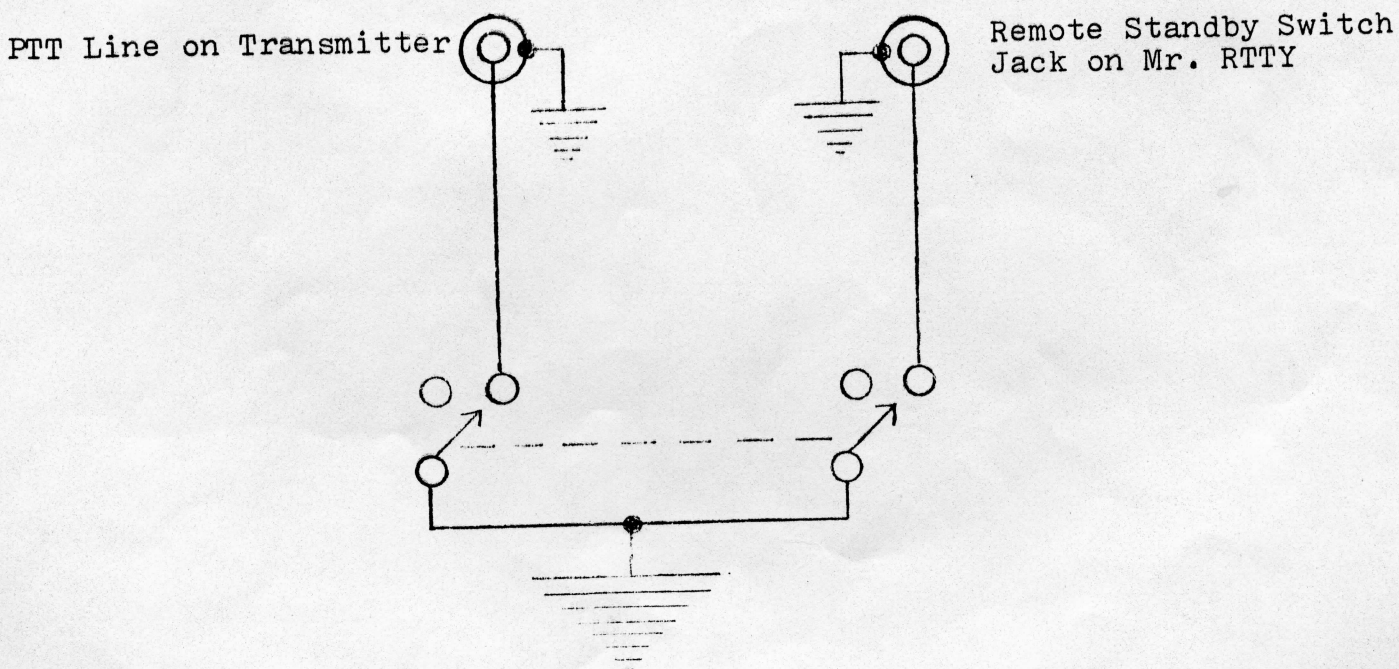
Suggested hook up connections for Mr. RTTY
 One switch operation of transmit-receive



Feeding the AFSK into the transmitter



Connection for controlling the PTT line and the remote standby switch with only one switch



PARTS LIST MR. RTTY

CAPACITORS: CONT.

C18 4.7 ELECTROLYTIC
C19 22 MFD ELECTROLYTIC
C20 10 MFD ELECTROLYTIC
C21 22 MFD ELECTROLYTIC
C22 22 MFD ELECTROLYTIC
C25 1000 MFD ELECTROLYTIC
C26 1000 MFD ELECTROLYTIC
C27 .01 1KV DISC
C28 SELECTED IN TUNING FILTERS
C29 SELECTED IN TUNING FILTERS
C30 .22 SELECTED IN TUNING FILTERS
C31 SELECTED IN TUNING FILTERS
C32 SELECTED IN TUNING FILTERS
C33 .022 SELECTED IN TUNING FILTERS
C34 SELECTED IN TUNING FILTERS
C35 SELECTED IN TUNING FILTERS
C39 200 PF
C40 .01 1KV DISC
C41 .01 1KV DISC
C44 .01 DISC
C45 .01 POLYSTRENE
C46 10 MFD ELECTROLYTIC
C47 10 MFD ELECTROLYTIC
C48 10 MFD ELECTROLYTIC

DIODES:

D1, 2, 5, 6, 7, 8, 9, & 10 IN270
D14, 15, 16, 17, 24, 28, 29, 30, 31 IN4007
ALL OTHERS IN4148

INTERGRATED CIRCUITS:

U1 LM709
-U2, 3, 4, LM1458
U5 XR2206

TRANSFORMERS:

T1 SECONDARY No. 1 125V 100MA
SECONDARY No. 2 25.2VCT 1 AMP.
T2 AUDIO TRANSFORMER 8OHM TO 600OHM RELAY

TRANSISTORS:

Q1 MJE 3439 or EQUIVILENT
Q2, 3, 4, 9, 11, 2N3906
Q5, 6, 7, 8, 10, 12, 13, 14, 15,
2N3904

FUSES:

F1 .1 AMP
F2 .5 AMP
F3 .1 AMP
F4 .5 AMP

SWITCHES:

S1 DPDT (Norm-Rev)
S2 DPDT (Limiter Switch, also turns
off Auto in off position)
S3 SPST (Standby)
S4 SPST (Auto-Start Fast Slow)
S5 SPST (Auto-Start On-Off)
S6 SPST (Power On-Off)

COILS:

L1 88MH TOROID
L2 88MH TOROID
L3 22MH TOROID
L4 22MH TOROID
L5 22MH TOROID

K1 DPDT 24VDC 500-OHM COIL

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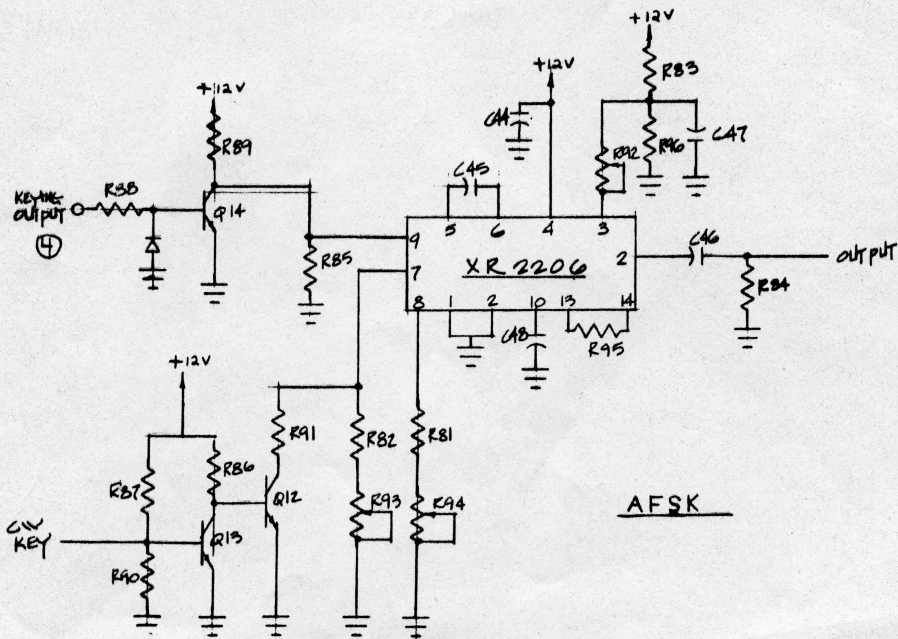
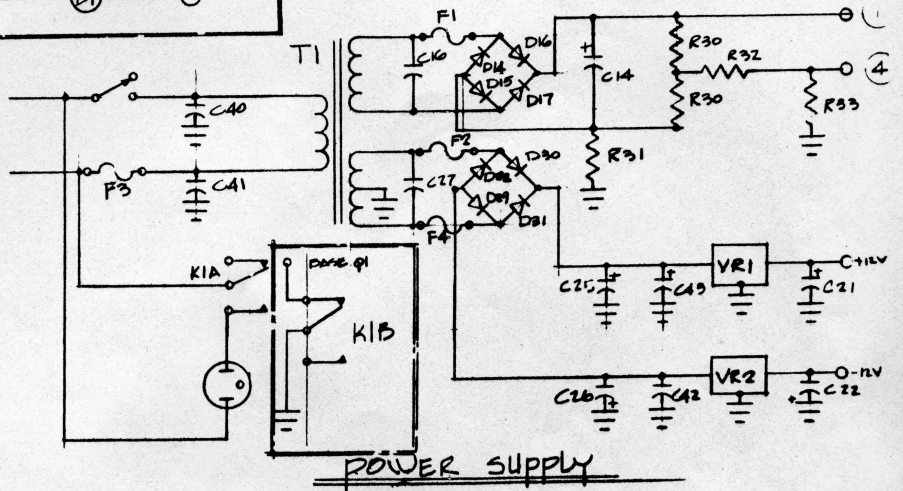
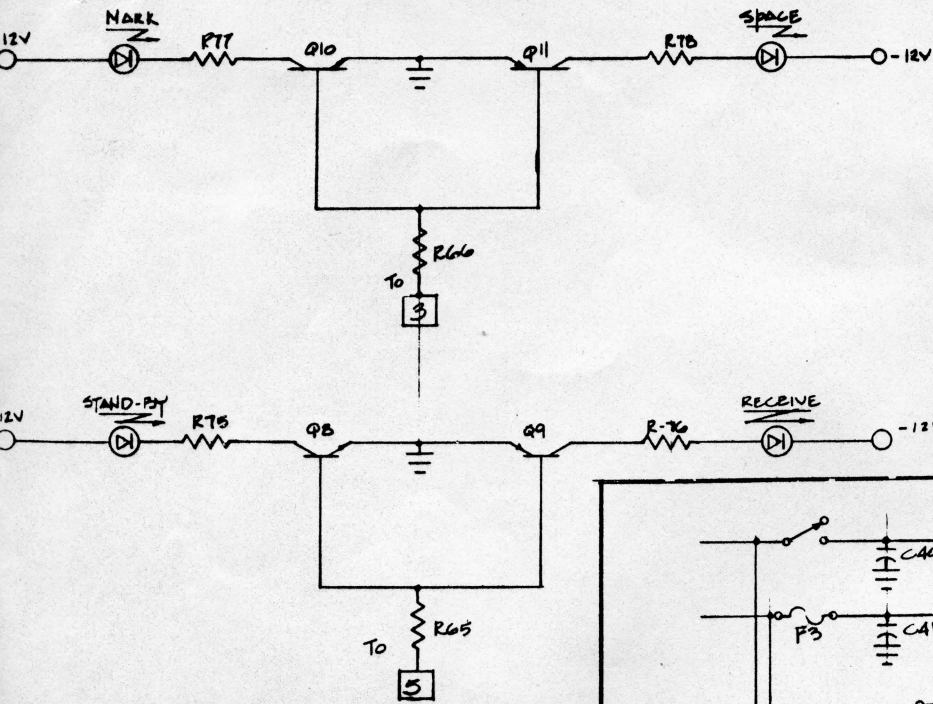
PARTS LIST MR. RTTY

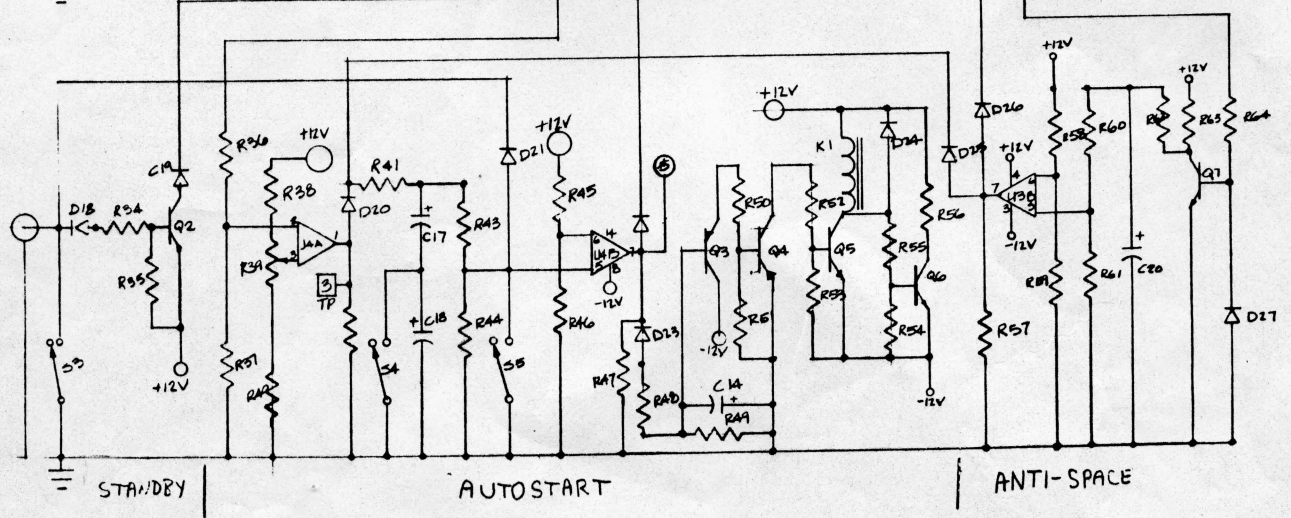
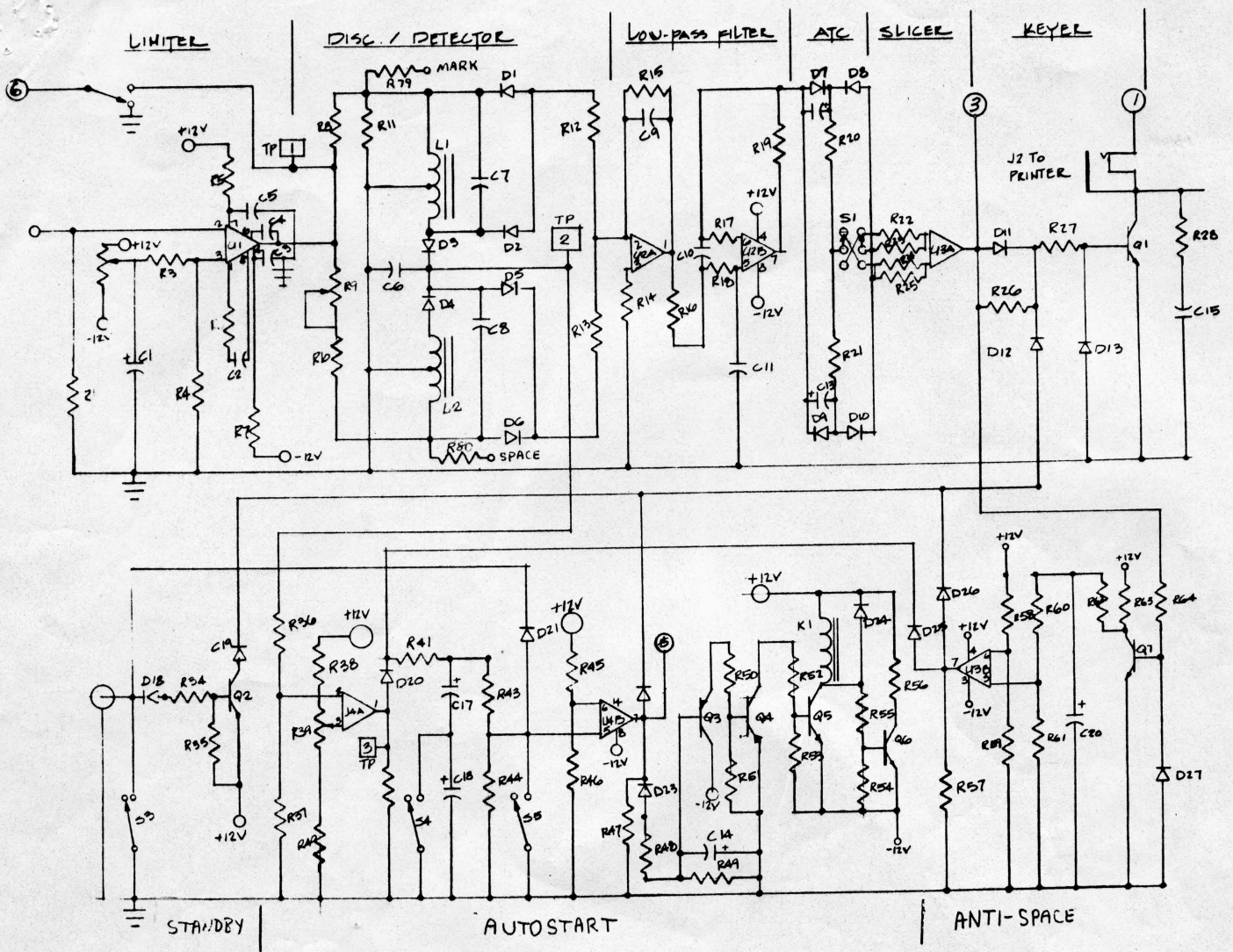
RESISTORS: (all $\frac{1}{2}$ Watt unless indicated otherwise)

R1 10K	R37 68K	R74 10K Trimpot
R2 10K Trimpot	R38 39K	R75 330 1 Watt
R3 150K	R39 5K Trimpot	R76 330 1 Watt
R4 100	R40 10K	R77 330 1 Watt
R5 47	R41 68K	R78 330 1 Watt
R6 1.5K	R42 33K	R81 39K
R7 47	R43 75K	R82 39K
R8 6.8K	R44 120K	R83 5.6K
R9 5K Trimpot	R45 10K	R84 10K
R10 6.8K	R46 2.2K	R85 2.2K
R11 100K	R47 33K	R86 10K
R12 100K	R48 2.2K	R87 22K
R13 100K	R49 2.2MEG	R88 10K
R14 100K	R50 10K	R89 10K
R15 270K	R51 10K	R90 22K
R16 10K	R52 4.7K	R91 390K
R17 33K	R53 4.7K	R92 10K Trimpot
R18 10K	R54 4.7K	R93 20K 20 Turn Trimpot
R19 220	R55 3.9K	R94 20K 20 Turn Trimpot
R20 22K	R56 500 5 Watt	R95 220
R21 22K	R57 33K	R96 5.6K
R22 220K	R58 10K	
R23 220K	R59 2.7K	CAPACITORS:
R24 220K	R60 56K	C1 .1 Tantalum
R25 220K	R61 47K	C2 47 PF
R26 33K	R62 330	C3 .1 DISC
R27 2.2K	R63 33K	C4 3.3 PF
R28 470 1 Watt	R64 10K	C5 .1 DISC
R29 15K 2 Watt	R65 10K	C6 .047 MYLAR
R30 15K 2 Watt	R66 10K	C7 .068 MYLAR (SELECTED CAPACITOR)
R31 3000 25 Watt	R67 1.6K	C8 .056 MYLAR (SELECTED CAPACITOR)
R32 82K 2 Watt	R68 560 1 Watt	C9 .012 MYLAR
R33 18K 2 Watt	R69 4.7K	C10 .18 MYLAR
R34 10K	R70 1K	C11 .68 MYLAR
R35 1K	R71 2.2K	C12 10 MFD ELECTROLYTIC
R36 68K	R72 470K	C13 10 MFD "
	R73 5.6K	C14 50 MFD 250V
		C15 .1 MFD 600V MYLAR
		C16 .011KV DISC
		C17 22 MFD ELECTROLYTIC

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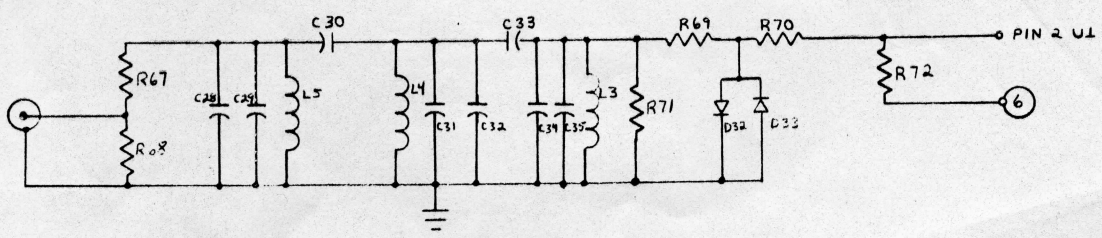
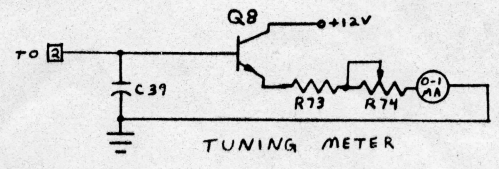
LAMP DRIVERS





1 Meg

Bill Jones



BANDPASS INPUT FILTER

