

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 SUPPLYS, ANTI-SPACE, AUTO-START, RECEIVE-STANDBY LAMP INDICATORS. A TUNING METER AND THE MAINLINE AK-2 AFSK GENERATOR.

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 -3DB 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 runing 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 SUPPLYS

The plus and minus 12 volt supplys, use transistors that are Zener-regulated and is capable of more than the amount of current required for Mr. RTTY.

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 RECEPTAL

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 AK-2 AFSK to be fed into the microphone circuit

of the transmitter and the output level is adjustable.

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 the 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.

THE MAINLINE AK-2 AFSK

The AK-2 uses a 555 timer as a pulse generator that runs at 4 times the normal mark speed.

These pulses are changed to square waves at the proper mark speed by a 7473. These square waves are then changed to sine waves by a 5-pole low pass filter using 88 Mh toroids. The oscillator mark tone in the AK-2 can change as much as 100 Hz and the 170 Hz shift will remain the same.

Zero-crossover keying is accomplished by the addition of a 7474 in the input keying system. The mark-space balance can be controlled by placing the jumper on the circuit board from pins 5 to 6 of the 7474 depending on which tone needs to be attenuated. It depends mostly on the transmitter the AK-2 is being used with as to which tone needs to be attenuated.

ADJUSTMENTS

A number of trim pots are included in the AK-2. One adjusts the output level to the transmitter. One adjusts the balance of the tones. One adjusts the proper shift from mark to space. One is a coarse adjustment of the mark frequency and the other is a fine adjustment of the mark frequency.

With a counter hooked to the output of the AFSK R1, is adjusted to 2125 Hz. (The loop on Mr. RTTY has to be closed when making this adjustment or the standby switch in the standby position)

Open the loop by plugging a dummy plug in the loop jack and adjust R3 for a reading of 2295 Hz.

R1 is adjusted while R2 is at it's midpoint and after R3 has been adjusted, R2 can be used as a fine adjustment for the mark freq. of 2125.

Check back and forth between the two frequencies. And make any minor adjustments needed.

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 fine adjustment pot (R2) can be adjusted to where the meter does peak.

The AK-2 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. All defective products should be returned to Radio Wholesale.

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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Store No. 319
Columbus, Georgia 31906

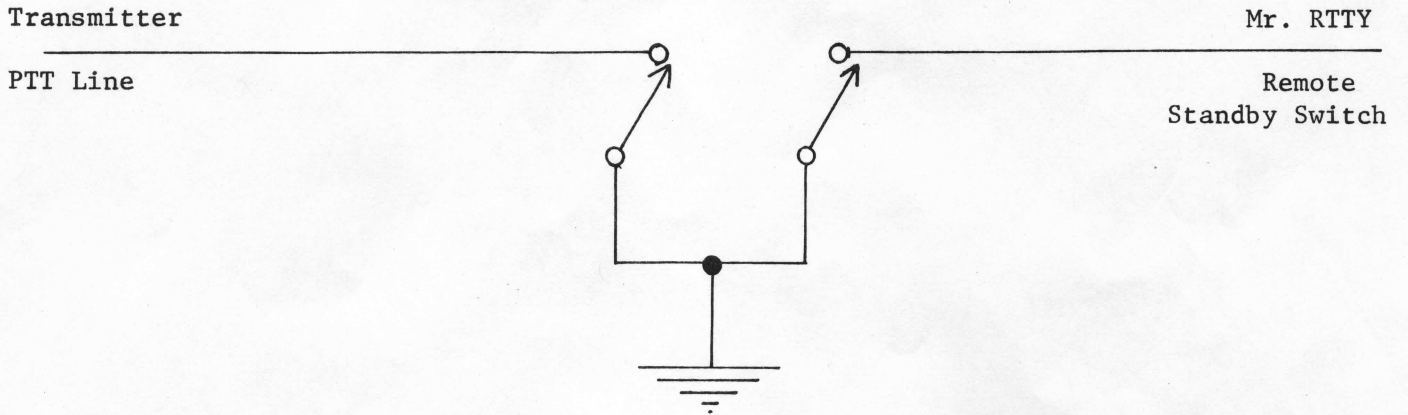
Phone: 404 / 561-7000 Nights and Holidays: 404 / 561-5300

WAREHOUSE HOURS:
Mon. thru Sat.
9 a.m. - 6 p.m. E.S.T.

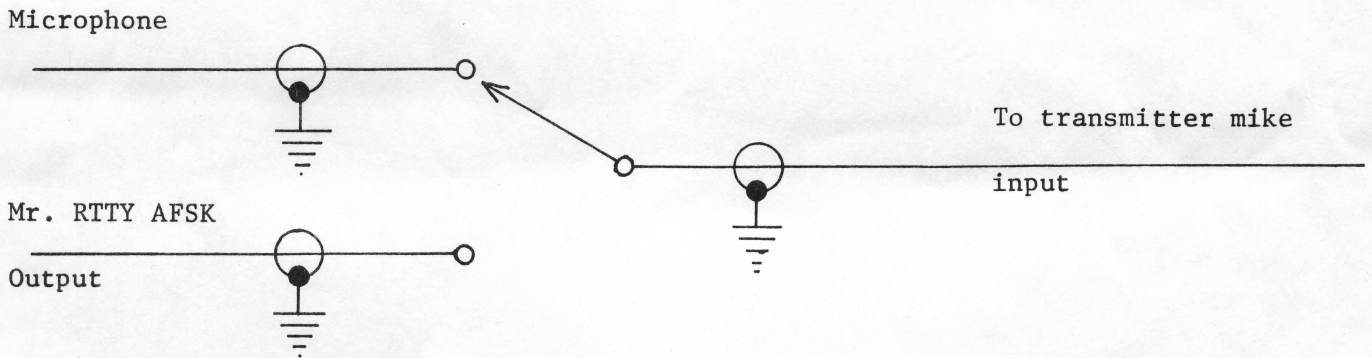
MANUFACTURERS - DISTRIBUTORS - OF AMATEUR RADIO EQUIPMENT

Suggested hook up connections for Mr. RTTY

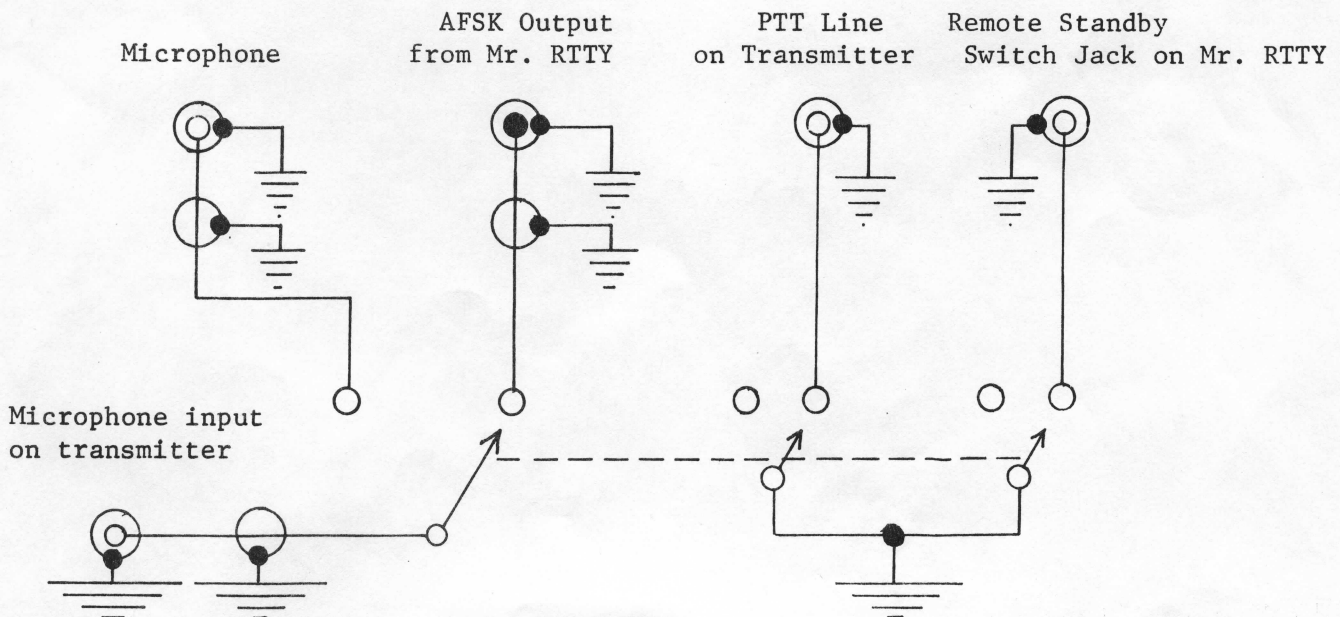
One switch operation of transmit-receive

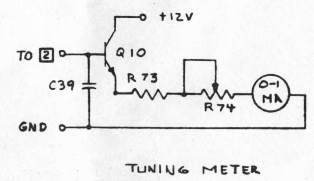
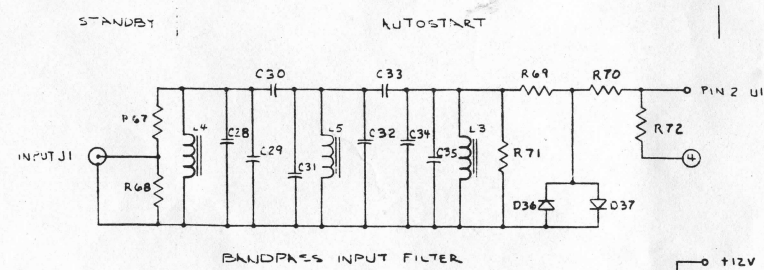
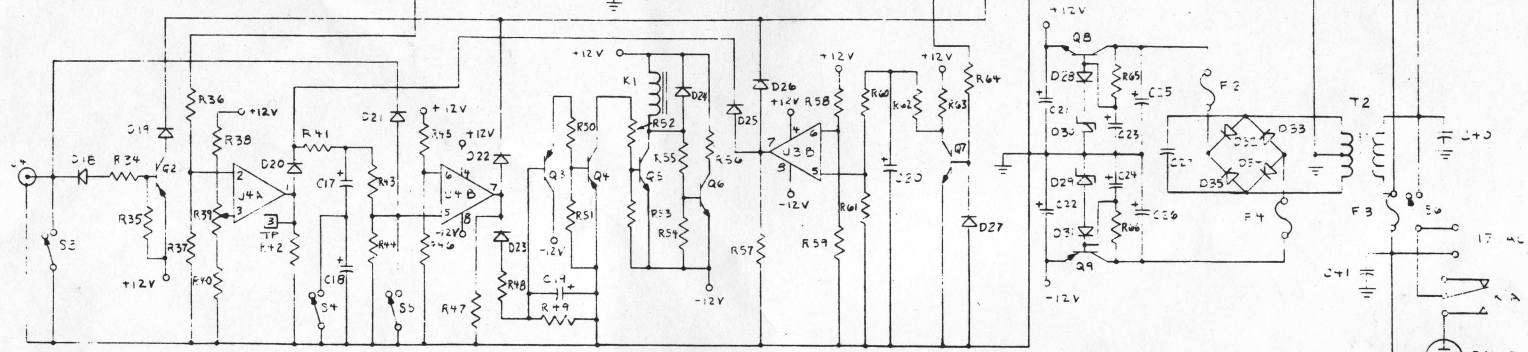
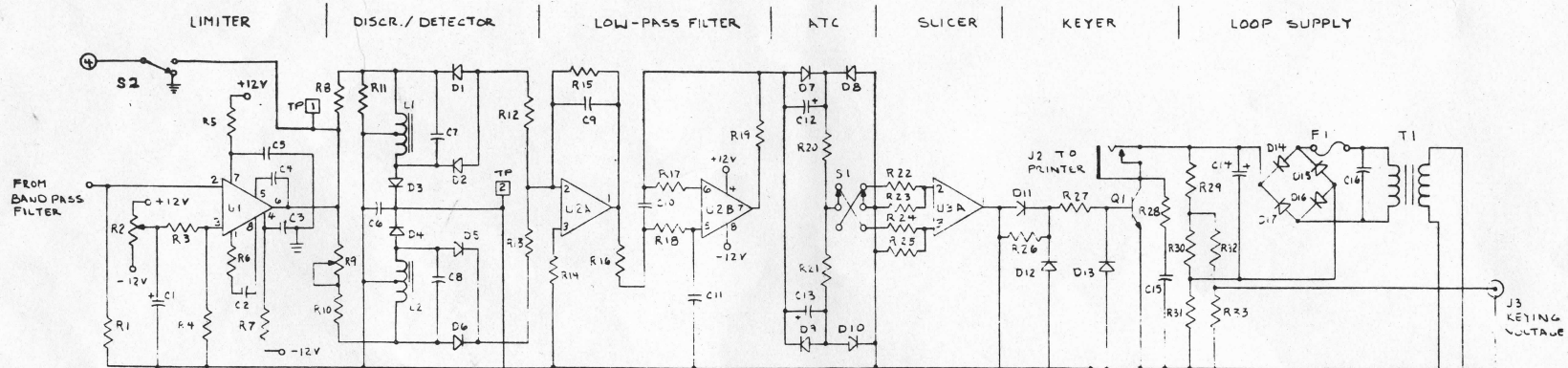


Feeding the AFSK into the transmitter

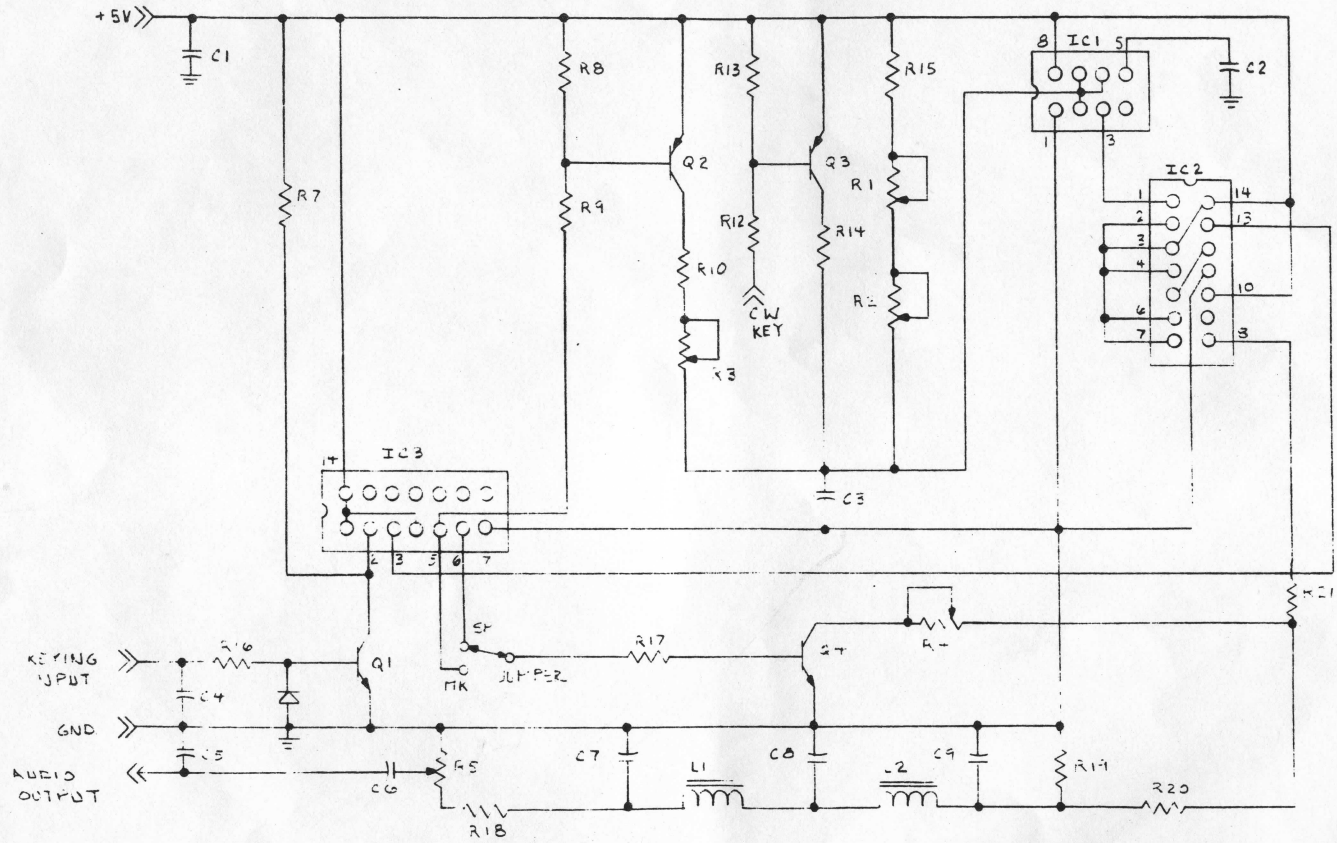


Connection for controlling the mike, PTT line and the remote standby switch with only one switch





ST-600 "MR RTTY"		
SCALE:	APPROVED BY:	DRAWN BY:
DATE:		REVISED:
TELETYPE DEMODULATOR		
		DRAWING NUMBER
		D-10677-1



SCALE:	APPROVED BY:	DRAWN BY: <i>[Signature]</i>
DATE:		REVISED:
MAINLINE AFSK RK2		
		DRAWING NUMBER A-10077-2

PARTS LIST AK-2 AFSK

RESISTORS

R1 2500 OHM TRIMPOT
R2 250 OHM TRIMPOT
R3 50K OHM TRIMPOT
R4 10K OHM TRIMPOT
R5 1K OHM TRIMPOT
R7 10K OHM
R8 10K OHM
R9 10K OHM
R10 Selected Value
During Alignment
R12 10K OHM

RESISTORS

R13 10K OHM
R14 110K OHM
R15 Selected Value
During Alignment
R16 10K OHM
R17 10K OHM
R18 220 OHM
R19 1.8K OHM
R20 2.7K OHM
R21 1K OHM

CAPACITORS

C1 .1 DISC
C2 .01 DISC
C3 .01 MYLAR or
POLYSTRENE
C4 .001 DISC
C5 .001 DISC
C6 .01 DISC
C7 .033 MYLAR
C8 .068 MYLAR
C9 .033 MYLAR

TRANSISTORS

Q1&Q4 2N3904 NPN OR EQUIVILENT
Q2&Q3 2N3906 PNP OR EQUIVILENT

PARTS LIST MR. RTTY

RESISTORS (All Resistors 1/2 Watt unless indicated otherwise)

R1 10K	R19 220	R37 68K	R55 3.9K
R2 10K TRIMPOT	R20 22K	R38 39K	R56 500 5Watt
R3 150K	R21 22K	R39 5K TRIMPOT	R57 33K
R4 100	R22 220K	R40 10K	R58 10K
R5 47	R23 220K	R41 68K	R59 2.7K
R6 1.5K	R24 220K	R42 33K	R60 56K
R7 47	R25 220K	R43 75K	R61 47K
R8 6.8K	R26 33K	R44 120K	R62 330
R9 5K TRIMPOT	R27 2.2K	R45 10K	R63 33K
R10 6.8K	R28 470 1Watt	R46 10K	R64 10K
R11 100K	R29 15K 2Watt	R47 33K	R65 470 1Watt
R12 100K	R30 15K 2Watt	R48 2.2K	R66 470 1Watt
R13 100K	R31 3000 25Watt	R49 2.2MEG	R67 1.6K
R14 100K	R32 82K 2Watt	R50 10K	R68 620 1Watt
R15 270K	R33 18K 2Watt	R51 10K	R69 4.7K
R16 10K	R34 10K	R52 4.7K	R70 1K
R17 33K	R35 1K	R53 4.7K	R71 2.2K
R18 10K	R36 68K	R54 4.7K	R72 470K
			R73 5.6K
			R74 10K TRIMPOT

PARTS LIST MR. RTTY

CAPACITORS

C1 .1 TANTALUM	C13 10 MFD ELECTROLYTIC	C27 .01 1KV DISC
C2 47 PF	C14 50 MFD 250V ELECTROLYTIC	C28 SELECTED IN TUNING FILTERS
C3 .1 DISC	C15 .1 MFD 600V MYLAR	C29 SELECTED IN TUNING FILTERS
C4 3 PF	C16 .01 1KV DISC	C30 .022 (SELECTED IN
C5 .1 DISC	C17 22 MFD ELECTROLYTIC	TUNING FILTERS)
C6 .047 MYLAR	C18 4.7 ELECTROLYTIC	C31 SELECTED IN TUNING FILTERS
C7 .068 MYLAR	C19 22 MFD ELECTROLYTIC	C32 SELECTED IN TUNING FILTERS
(SELECTED CAPACITOR)	C20 10 MFD ELECTROLYTIC	C33 .022 (SELECTED IN
C8 .056 MYLAR	C21 22 MFD ELECTROLYTIC	TUNING FILTERS)
(SELECTED CAPACITOR)	C22 22 MFD ELECTROLYTIC	C34 SELECTED IN TUNING FILTERS
C9 .012 MYLAR	C23 100 MFD ELECTROLYTIC	C35 SELECTED IN TUNING FILTERS
C10 .68	C24 100 MFD ELECTROLYTIC	C39 200 PF
C11 .18	C25 1000 MFD ELECTROLYTIC	C40 .01 1KV DISC
C12 10 MFD ELECTROLYTIC	C26 1000 MFD ELECTROLYTIC	C41 .01 1KV DISC

DIODES

D1, 2, 5, 6, 7, 8, 9 & 10	IN270
D14, 15, 16, 17, 32, 33, 34, 35 & 24	IN400 7
ALL OTHERS	IN414 8

TRANSISTORS

Q1 MJE 340 or EQUIVILENT
Q2, 3, 4 2N3906 or EQUIVILENT
Q5, 6, 7, 10 2N3904 or EQUIVILENT
Q8 2N5296 or EQUIVILENT
Q9 2N6107 or EQUIVILENT

INTERGRATED CIRCUITS

U1 709C
U2, 3, 4 Dual Operation Amplifier

FUSES

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

TRANSFORMERS

T1 125V 50MA Secondary
T2 25.2VCT 1A Secondary

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)