

Autocaller with old Maplin kit

By G8MNY

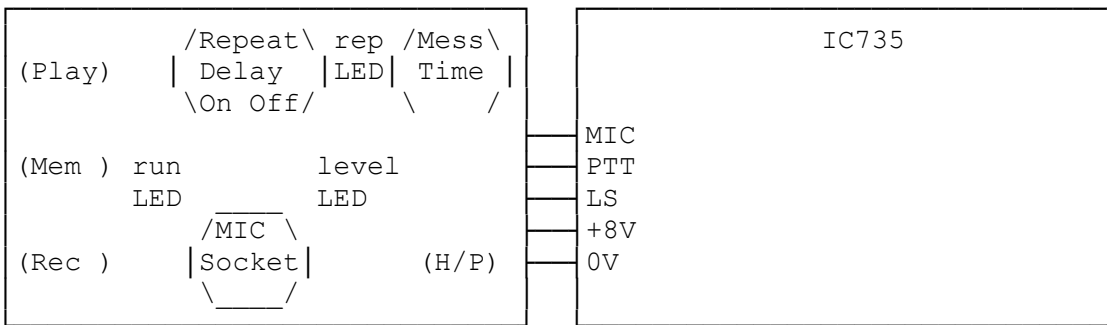
(Updated Dec 14)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

I had built a few of these Digital Record & Playback Modules kits from 1989 for Contest calling, ATV repeater announcements & Commercial Radio use. So when saw a new unbuilt kit at a junk sale I snapped it up. This new build came 2nd in a construction contest.

Although with my IC735 HF rig there is a rear Aux socket with +13.8V, that has all of the wanted signals, I use that for Demo station AF PA conection, so I did not want use it here. I managed to used just the mic plug connection. the max rating of the 8V @ 1A peak, including the radio! But I found I had some sensitive DIL package 12V 1K coil DIL reed changeover relays worked OK on 8V! (but not all of them!)

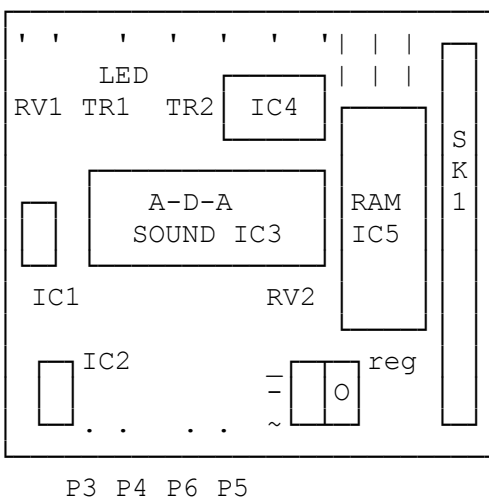
LS



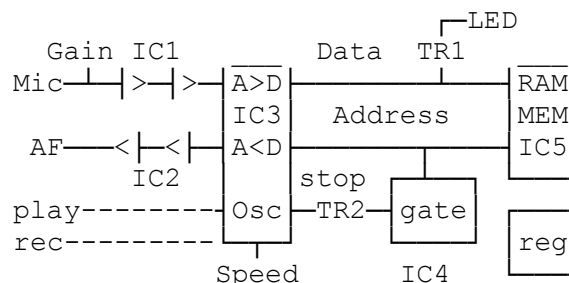
THE KIT

It consists of an Electret Mic, 2 dual op-amps LF442 IC1 & 2, a dedicated A-D-A sound 40pin IC3 UM5100, logic IC4 74HC133, 256K memory Ram 62256 IC5, & 5V reg. IC3 has clock output that is used to make -ve rail for the opamps. For fixed work, the ram can be an eeprom, a seperate add on kit is an eeprom programmer (plugs into SK1) & banks of eeproms can be use together for multi messaging etc.

P1 P2 P7 P8 P10 P12 P11 Mem Links



- P1 Electret Mic
- P3 AF Output
- P10 Play
- P11 Record
- P5 +8-14V in
- P7 +5V out
- P2,4,5,6,9,12 0V



The op-amps are used with the A-D-A input/output to generate the data, filter & replay it. It is fairly flat 300Hz-3kHz with up to 40dB S/N, at 10 seconds message time. Up to 23 sec is usable, but quality is much reduced. For external mic/AF use, I removed the mic DC feed.

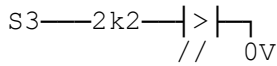
BELL & WHISTLES

1/ Message time.

I extended the clock frequency preset RV2 to the front panel, to enable long or short messages, & also variable speed on recorded items like CW.

2/ Status LEDs

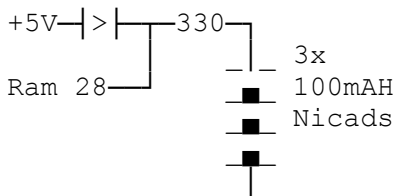
I also extended the level LED & added as "4 Pulse" LED from a high order count address line A12 on the programmer socket. This gives a simple end of message warning.



With the later repeat toggle latch, I also added a "Repeat On" LED too.

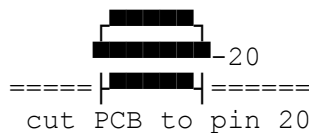
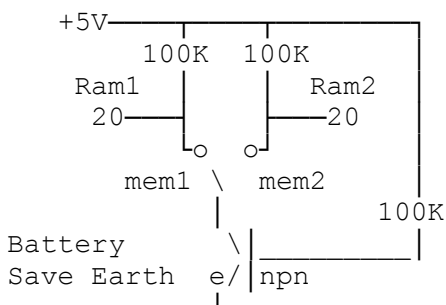
3/ Battery backup.

To store the message on power off a battery backup is needed to power just the Ram to > 2.4V. Cut the 5V track feeding the Ram & add..



4/ Second message Ram.

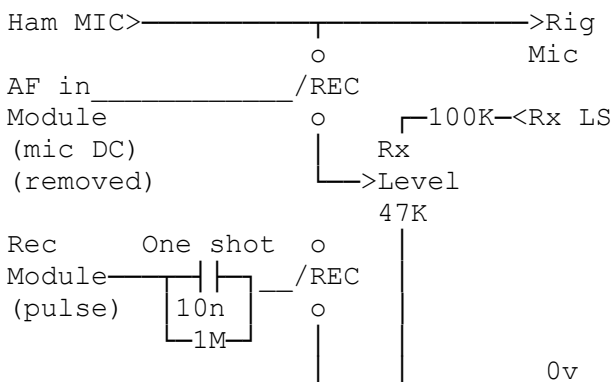
I piggy backed on a 2nd message Ram. I soldered the first directly in to the PCB with the Chip Select pin 20 track cut, & added a socket on top for the 2nd ram, also with CS pin isolated. I use a locking push switch to select the RAM.



By add this NPN the power off batt current is reduced from mA to uA!

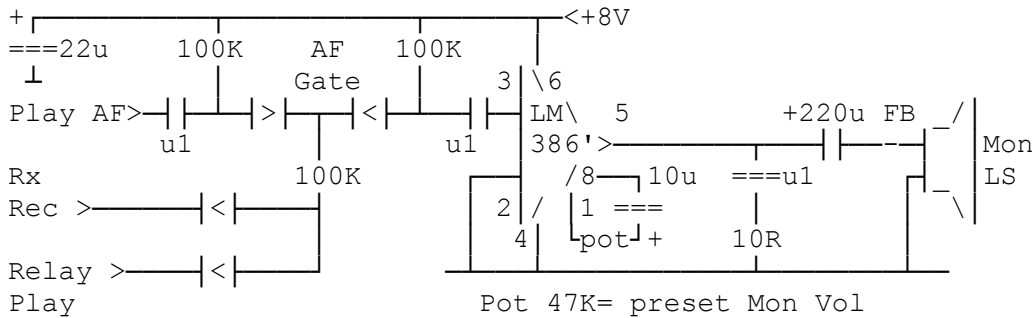
5/ Record Rx.

This uses a non locking double pole changeover push button, to trigger record mode & change over from mic to Rx LS record, when record button is held in.



6/ Mon LS.

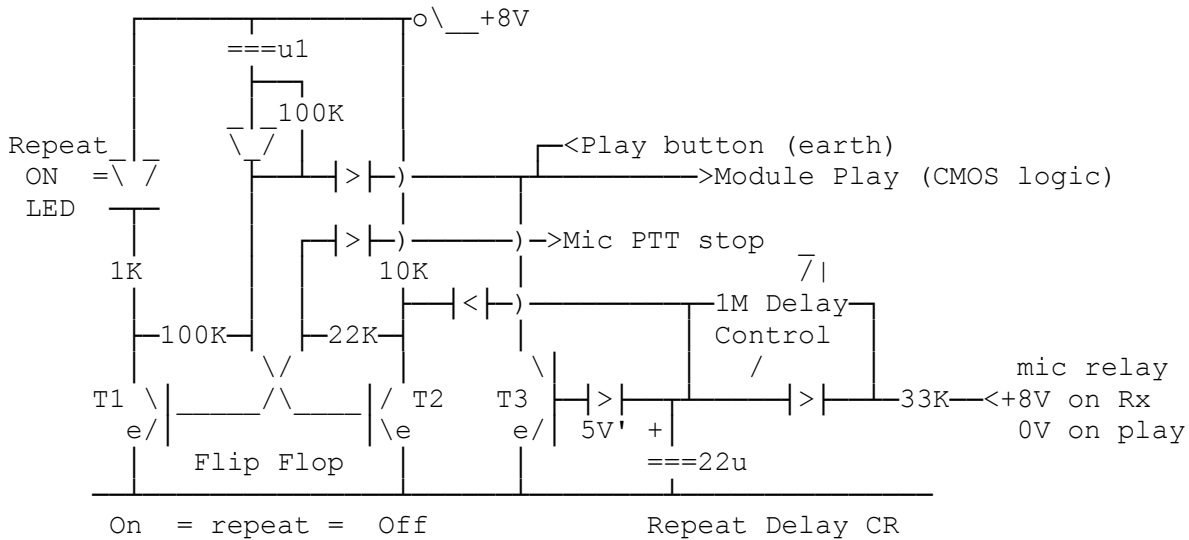
I added an old LM386 360mW amp & 8R LS as monitor. But used an AF diode gate in front of it to mute LS, unless it was playing or recording off the Rx LS line.



7/ Repeat timer.

I was going to use a 555 timer. But close investigation I saw an easy solution, just an NPN & zener with a CR in front of it. Although this worked well, I soon realised a toggle flip flop bistable was needed too, for ease of operation.

Repeat On off with Delay control (a switched vol control pot)



The 33K sets the min delay to about 1 second Rx, & +1M to >60 seconds. Turning the delay timer on, turns on T2 via u1. This ensures the 22u can't charge up.

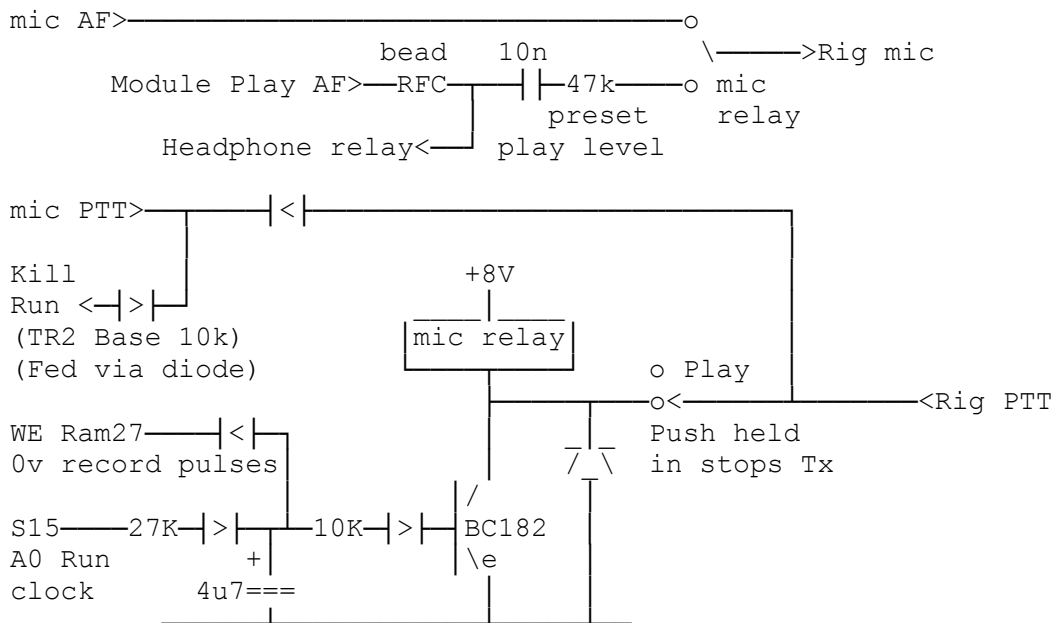
Pressing the Play button fires the module to play & also turn off T2 that flips the toggle. T1 now on, lights the Repeat LED. T2 off lets 22u charge up when the play has finished, from the 8V via the Mic relay coil. When > 5V, T3 is turned on initiating another play.

Pressing the Mic PTT puts a good earth via diode to T1's base turning it off & flipping the toggle into not repeat mode. So does the initial power on pulse via u1 & diode with C charging 100K R.

RIG INTERFACING

A/ PTT

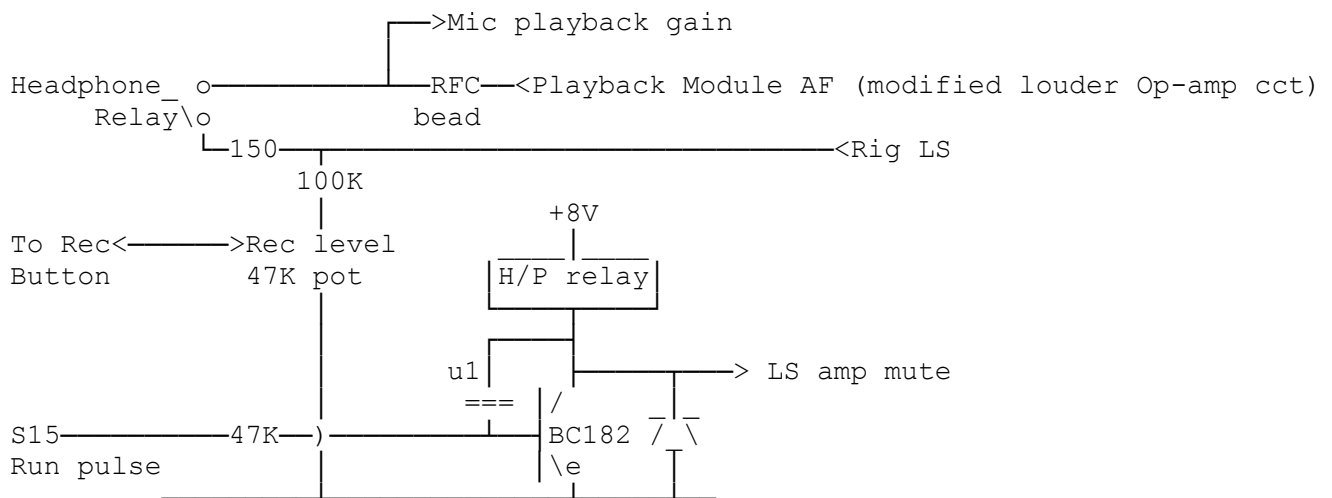
This was not straight forward! The kit does not have an ON PLAY line, so I detected the fastest run clock A0 on S15 to generate a PTT line.



As I did not want the PTT or mic relay (mic powered from rig) operated on record I used the 0V Write Enable pulses to discharge the 4u7 to defeat the action.

B/ Headphones.

The last op-amp IC2 is just powerful enough to give playback headphone level with cap changed & a NFB gain pot added, to the last unit gain amp. So I added another reed relay changeover for the headphone feed.



The 150R in the headphone feed is selected to give suitable level from the rig's LS line.

WIRING UP

With all these mods the unit is quite complex, but I managed it with just 1 additional vero PCB & loads of coloured wiring, CAD documenting it as I went.

One thing I did miss was the effect of the LS magnet on the nearby reed relays, once the lid was on! A tin can cover glued/soldered over the magnet was needed!

CALIBRATION

There are several pots in the system, a bit of a round ribbon to get right straight away, some need to be set first, before the others are adjusted.

- 1/ Set the original mic in gain RV1, to "just distort" if shouting into the mic (Level LED flashes brightly).
- 2/ Set added Playout gain level on IC2, to give adequate headphone level.
- 3/ Set Playout level mic feeding preset to give same Tx level as the live mic.
- 4/ Re check 1 2 & 3 for best results.
- 5/ Set Rx LS vol to typical level on a Rx signal. Set Rx Rec pot for same flashing LED level as with mic record.
- 6/ Set Mon LS play level to a comfortable background check level.

ERGONOMIC CONTROLS

In use the controls make it very easy to use. With headphones on you can hear the Rx, pre-recorded messages, Tx or not depending on keeping the play button pressed. A stab of the record button, records the mic for the 4 LED flashes, or keeping the button pressed, it records the Rx AF, were the rig Volume control setting the level all heard in the headphones.

Without the headphones you just hear playouts on the LS. but not when recording the mic. Pressing the mic PTT kills the player & the repeat toggle. Recordings should be made with repeat set to off!

Replay of Rx recording come over best if the rig's mic processing is "OFF" !

See my other tech bul on "PA instability in ICOM IC735" & "IC 735 No RF Output Fault"

Why Don' U send an interesting bul?

73 De John, G8MNY @ GB7CIP