

Curtis CW Identifier

When repeaters started getting very popular and manufacturers began to tool up their assembly lines for production of 2m FM transceivers, a representative of Curtis Electro Devices called me to ask what the potential might be for a repeater ID unit. Curtis has been manufacturing electronic keyers for some time, and the switchover to an automatic ID unit seemed logical enough. It seemed to me that the market could certainly afford at least one manufacturer in the identifier field, provided that the manufacturer could afford to produce the unit at a cost that was within the budget of the average repeater group.

The Curtis people were not too involved with repeater operation, but they wanted to make their identifier solve all the problems associated with automatically identifying repeaters; so the representative listened while I listed all the desirable features such a unit would have — which were considerable. Within two months, I opened a package that came in the mail and found what I consider to be the ideal identifier. Curtis had taken the ideas I'd given and combined them with some of their own, and the result was a working production ID unit that can be easily installed into any repeater within minutes. What's more, the Curtis identifier contains in its one small package all the control circuitry, tone oscillator, and relay contacts required to make the unit immediately operational.

When properly connected into a repeater, the identifier will send out a modulated CW signal when the first carrier appears on the repeater input. From that point on, it will identify at three-minute intervals as

long as the repeater is being used. When all the carriers drop out and the repeater is no longer being accessed, the Curtis identifier will send out one more ID at the end of 3 minutes, then it will keep quiet; and it will remain quiet until someone else comes along and uses the repeater.

The unit has a built-in speaker so that you can hear the ident when you are testing or installing the system. And an inside-mounted switch allows you to cut off the speaker when you're through making checks. The unit has a set of relay contacts built in, too. These contacts stay closed during the time the identifier is generating its signal; they are used to lock the repeater transmitter on during an ident so the identification signal won't get cut off in mid-sentence.

Other features include a volume control to adjust the level of the modulated CW signal into the repeater transmitter, a speed control to adjust the rate of the automatic identification signal, and various terminals to change the mode of operation from "automatic" to "manual" — or from periodic keying to keying each time a carrier appears.



The Curtis ID package. The terminal strip gives access to all control, voltage and ground points needed for fully automatic operation.

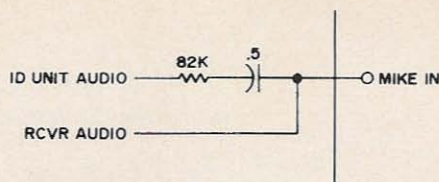


Fig. 1. A series resistor/capacitor network in effect increases the impedance of the ID unit's audio output, and prevents circuit loading.

The Curtis automatic identification unit should be compatible with most repeaters, because it uses a negative dc voltage (12–28V) for control. A ground signal, as from the carrier-operated relay, keys the identifier, but does not cause triggering of the ID until the required time period has elapsed.

When I connected the identifier into the WA1KGO repeater, I noticed that the audio from the Curtis unit tended to swamp the audio arriving from the receiver. This situation resulted in repeater users being jammed out by the identifier. I placed an 82 kΩ resistor and a 0.5 μF capacitor in series with the audio lead from the identification unit (Fig. 1), and that solved the problem.

I didn't do a great deal of thinking or planning before I connected the ID unit initially, and I ended up paralleling the ID unit's contacts with those of the transmitter PTT. This is an acceptable scheme, but it resulted in an automatic identifica-

tion every three minutes, day and night, even when the repeater was not in use. This was because of the small bias voltage on the PTT line. If you like to sleep with your monitor receiver on, you'd be driven quite mad with this sort of hookup. I know I was. So I raced up to the hilltop and made a few small control-circuit changes; the final interconnect circuit is shown in Fig. 2. This latter arrangement keeps the unit from generating an ID signal unless the repeater is actually being keyed, but it does not keep the unit from finishing its ID once it's started, even if the incoming carrier drops out.

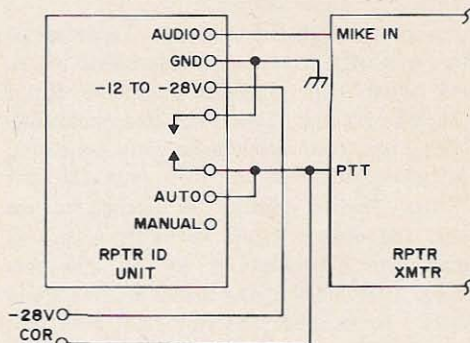
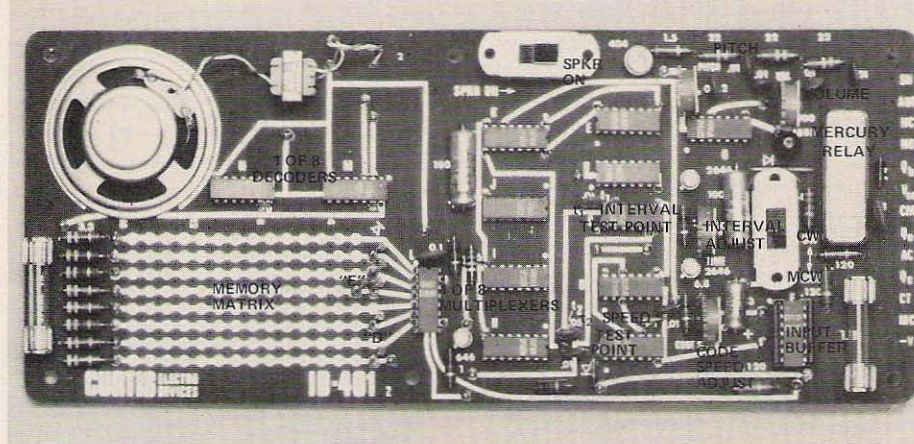


Fig. 2. This interconnect scheme allows identification only when repeater is in use.

Technical Aspects

The block diagram (Fig. 3) can be used to follow this operational description. When a signal from the carrier-operated



Inside the Curtis ID-401. A PC-mounted speaker (upper left) allows monitoring of the audio signal even before the ID unit is connected to the repeater. The memory matrix (below speaker) can be programmed or reprogrammed by amateurs in the field. The matrix shown is programmed for "DE" only, as indicated by the diode placement.

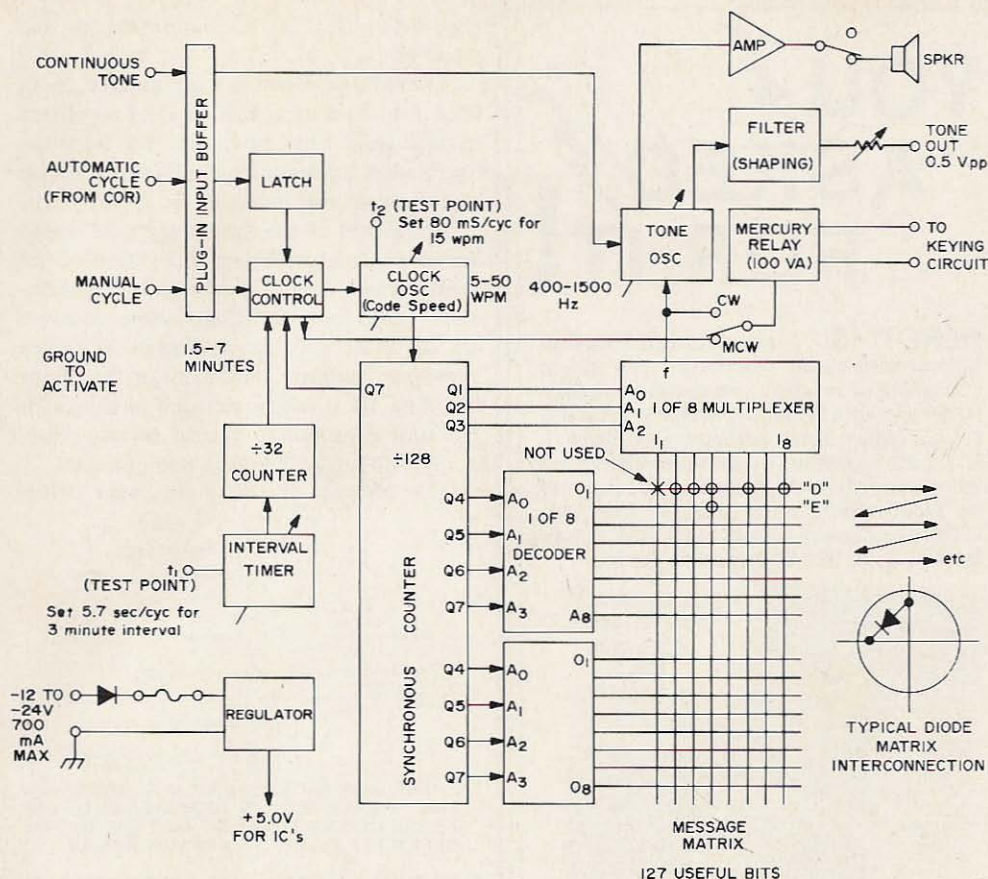


Fig. 3. Block diagram of Curtis ID-401 identification unit.

relay in the repeater grounds the "automatic cycle" input a latch is set indicating the closure regardless of duration. For the first closure after the repeater has been at rest, the clock control starts the clock which is fed into a +128 counter. This counter is fed to two 1 of 8 decoders and one 1 of 8 multiplexer. The decoders ground the horizontal matrix lines in sequence starting at the top and proceeding downward. Each line is held low for eight clock cycles.

At the same time, the 1 of 8 multiplexer is scanning the vertical lines — acting in effect like a single-pole, eight-position switch. In this manner the matrix is scanned bit by bit from the upper left down to the lower right.

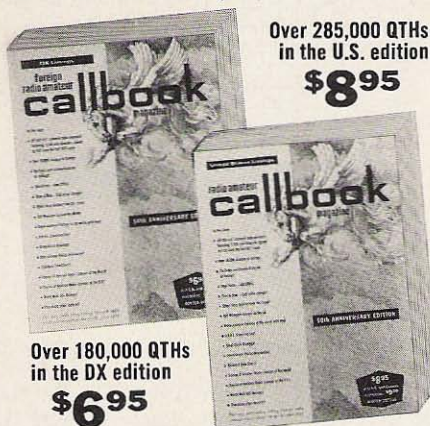
Each intersection between the vertical and horizontal lines which is connected by a diode pulls the input of the multiplexer

low. Each "low" is interpreted as a dot; three in a row is a dash. Where a diode is not connected, the output represents a space. In effect, the memory plays out just like a paper tape. You can read the message by examining the diodes. Programming or reprogramming requires only a knowledge of Morse code and no knowledge of Karnaugh maps.

The memory plays out one time and stops until the interval counter counts out the set interval at which time the program will play out once more. If the repeater has been activated during the waiting period the timer will again count out a set interval and cause the unit to identify once more. Only when an interval passes without repeater activation will the unit cease identifying. And at the same time, the unit will not ID more often than the set interval

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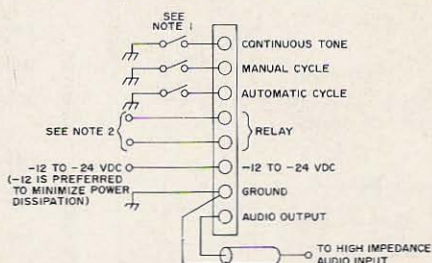
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regardless of what is happening at the repeater.

The interval timer is a unijunction oscillator followed by a +32 counter to obtain reliable long time intervals over temperature and independent of line frequency (in case the unit uses batteries for standby).

Activation of the "manual cycle" input causes continuous IDing. Activation of the "continuous tone" input gives a continuous audio output. These three controls are all buffered by a plug-in IC since improper hookup may damage the input ICs. The IC is easily changed in the field. The unit is protected against reverse polarity. A fuse (and a spare) is also provided.

The output of the multiplexer drives



1. THESE CONTACTS SHOULD CLOSE WHEN THE REPEATER IS COMMANDED ON. THESE CONTACTS MUST NOT BE ON THE REPEATER CARRIER KEYING RELAY.

2. TO KEY CARRIER, USE DIODE ARC SUPPRESSION WHEN DRIVING RELAYS. ALSO R/C SUPPRESSION. SEE CHART.

Fig. 4. Terminal strip of the 401. Internal controls are set as follows at factory: Speed, 15 WPM; Time, 3 minutes; Pitch, 650 Hz; Volume, Full; Speaker, On. Relay Mode, MCW.

both the MCW oscillator and a mercury reed output relay. The relay may be switched to either a CW (keys the Morse) or MCW (key down during whole program) position.

The audio drives both a switchable internal speaker and is filtered and level controlled for directly modulating the repeater carrier.

The interval timer is variable between 1.7 and 7 minutes, the speed from 5 to 50 wpm and pitch from 400 to 1500 Hz.

The regulated power supply allows operation from -12 to -28V dc and draws about 700 mA.

The unit employs 14 ICs, three of which are MSI types. ... K6MVH