



**INTEGRATED CIRCUITS INC.**

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# VOICE OTP

## aP89XX\_DBTR20

### Demo Board

***A*PLUS INTEGRATED CIRCUITS INC.**

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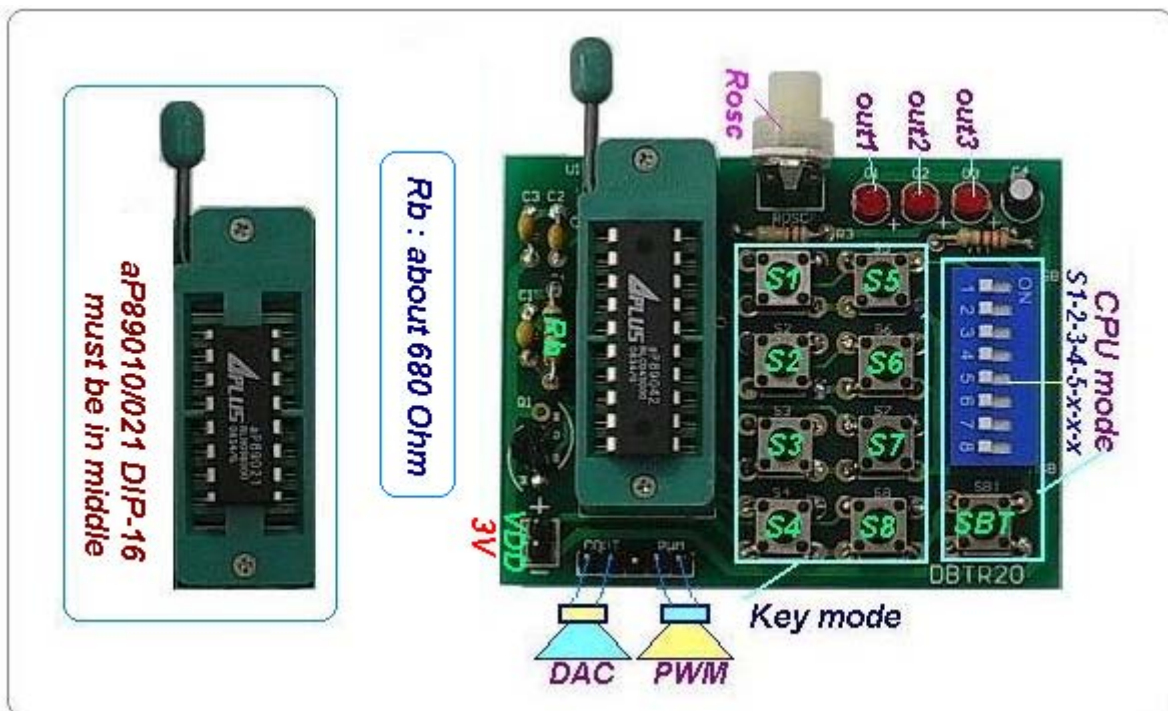
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# AP89XX\_DBTR20 DEMO BOARD USER MANUAL

|                | Durations | PHRASE   |          | TG - pin | PDIP | SOP | DIE | VCC        |
|----------------|-----------|----------|----------|----------|------|-----|-----|------------|
|                |           | Key mode | CPU mode |          |      |     |     |            |
| <b>aP89042</b> | 42''      | 32       | 32       | 8        | 20   | 20  | YES | 2.2 ~ 3.6V |
| <b>aP89021</b> | 21''      | 12       | 12       | 4        | 16   | 16  | YES | 2.2 ~ 3.6V |
| <b>aP89010</b> | 10''      | 12       | 12       | 4        | 16   | 16  | YES | 2.2 ~ 3.6V |

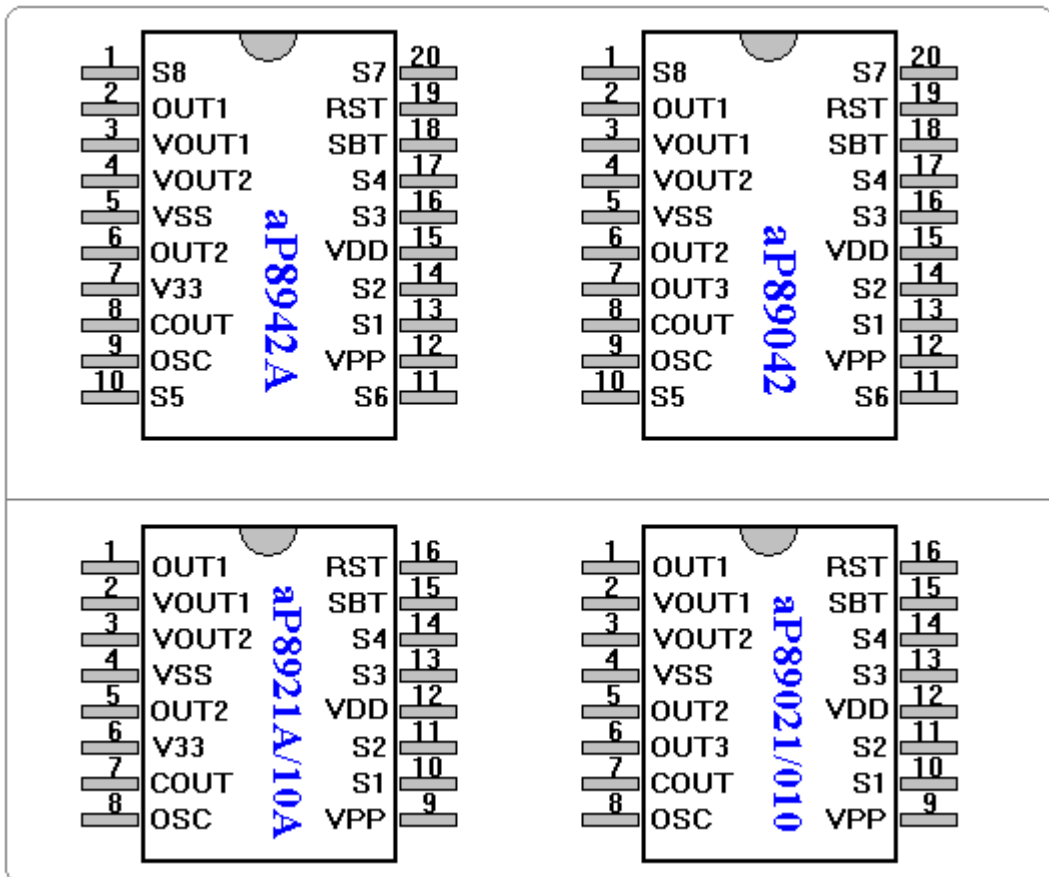
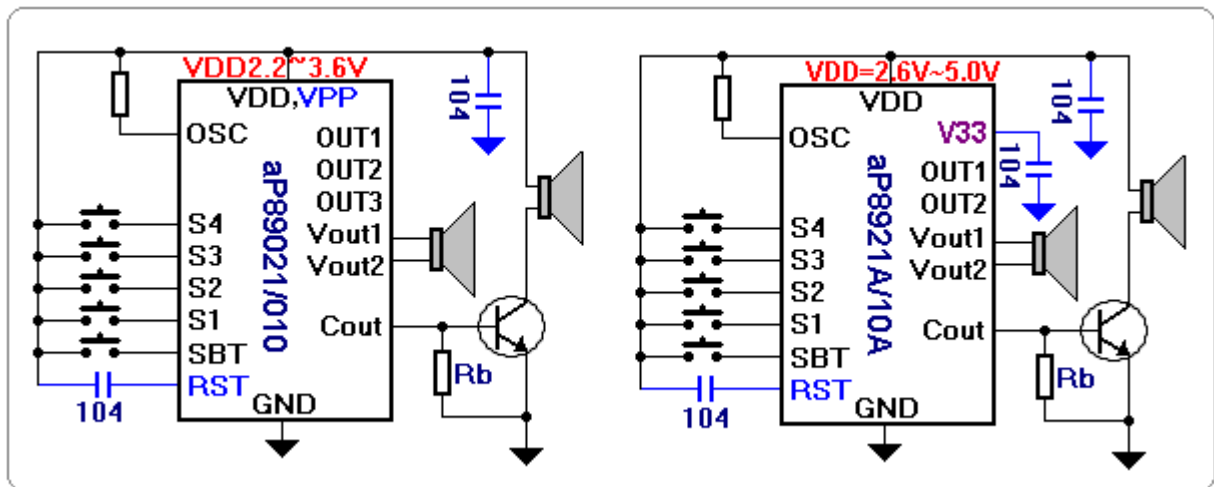
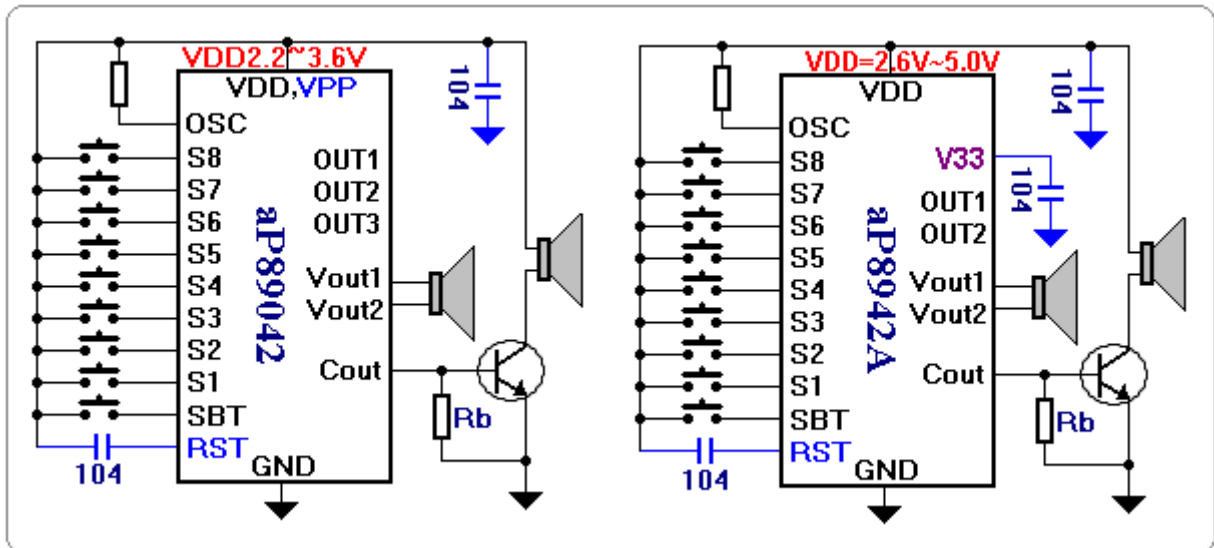
|          | aP89042/021/010 |      |       |
|----------|-----------------|------|-------|
|          | Out1            | Out2 | Out3  |
| Option-1 | LED2            | LED1 | BUSY  |
| Option-2 | STOP            | LED1 | LED2  |
| Option-3 | LED1            | BUSY | STOP  |
| Option-4 | LED1            | BUSY | /BUSY |



- PART NO. : **AP89XX\_DBTR20**
- PCB NO. : 8202
- PCB SIZE : 62.3 x 48.3 mm
- Rb : aP89042,aP89021 & aP89010 about --- 680 Ohm
- VDD : VDD=3.0V --- for aP89042,aP89021 & aP89010
- DIP-16 ( aP89021,aP89010 ) must be in middle
- **TRIGGER TYPE : key mode & CPU mode by compile option**
  - a. KEY Trigger :
    - a1. S4 ~ S1 & SBT , max. 12 sections for aP89021/010
    - a2. S8 ~ S1 & SBT , max. 32 sections for aP89042
  - b. CPU Parallel Trigger :
    - b1. address : S4(MSB)-S3-S2-S1(LSB) + SBT key trigger, max. 12 sections for aP89021/010
    - b2. address : S5(MSB)-S4-S3-S2-S1(LSB) + SBT key trigger, max. 32 sections for aP89042

| Voice group | aP89021/010 & aP8921A/10A Key mode |    |    |    | aP89021/010 CPU mode |    |    |    |
|-------------|------------------------------------|----|----|----|----------------------|----|----|----|
|             | S4                                 | S3 | S2 | S1 | S4                   | S3 | S2 | S1 |
| 1           | 0                                  | 0  | 0  | 1  | 0                    | 0  | 0  | 0  |
| 2           | 0                                  | 0  | 1  | 0  | 0                    | 0  | 0  | 1  |
| 3           | 0                                  | 1  | 0  | 0  | 0                    | 0  | 1  | 0  |
| 4           | 1                                  | 0  | 0  | 0  | 0                    | 0  | 1  | 1  |
| 5           | 0                                  | 0  | 1  | 1  | 0                    | 1  | 0  | 0  |
| 6           | 0                                  | 1  | 1  | 0  | 0                    | 1  | 0  | 1  |
| 7           | 1                                  | 1  | 0  | 0  | 0                    | 1  | 1  | 0  |
| 8           | 1                                  | 0  | 0  | 1  | 0                    | 1  | 1  | 1  |
| 9           | 0                                  | 1  | 1  | 1  | 1                    | 0  | 0  | 0  |
| 10          | 1                                  | 1  | 1  | 0  | 1                    | 0  | 0  | 1  |
| 11          | 1                                  | 1  | 0  | 1  | 1                    | 0  | 1  | 0  |
| 12          | 1                                  | 0  | 1  | 1  | 1                    | 0  | 1  | 1  |

| Voice Group | aP89042 --- KEY Mode |    |    |    |    |    |    |    | aP89042 ---CPU Mode |    |    |    |    |
|-------------|----------------------|----|----|----|----|----|----|----|---------------------|----|----|----|----|
|             | S8                   | S7 | S6 | S5 | S4 | S3 | S2 | S1 | S5                  | S4 | S3 | S2 | S1 |
| 1           | 0                    | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0                   | 0  | 0  | 0  | 0  |
| 2           | 0                    | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0                   | 0  | 0  | 0  | 1  |
| 3           | 0                    | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0                   | 0  | 0  | 1  | 0  |
| 4           | 0                    | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0                   | 0  | 0  | 1  | 1  |
| 5           | 0                    | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0                   | 0  | 1  | 0  | 0  |
| 6           | 0                    | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0                   | 0  | 1  | 0  | 1  |
| 7           | 0                    | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0                   | 0  | 1  | 1  | 0  |
| 8           | 1                    | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                   | 0  | 1  | 1  | 1  |
| 9           | 0                    | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 0                   | 1  | 0  | 0  | 0  |
| 10          | 0                    | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 0                   | 1  | 0  | 0  | 1  |
| 11          | 0                    | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 0                   | 1  | 0  | 1  | 0  |
| 12          | 0                    | 0  | 0  | 1  | 1  | 0  | 0  | 0  | 0                   | 1  | 0  | 1  | 1  |
| 13          | 0                    | 0  | 1  | 1  | 0  | 0  | 0  | 0  | 0                   | 1  | 1  | 0  | 0  |
| 14          | 0                    | 1  | 1  | 0  | 0  | 0  | 0  | 0  | 0                   | 1  | 1  | 0  | 1  |
| 15          | 1                    | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0                   | 1  | 1  | 1  | 0  |
| 16          | 1                    | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0                   | 1  | 1  | 1  | 1  |
| 17          | 0                    | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 1                   | 0  | 0  | 0  | 0  |
| 18          | 0                    | 0  | 0  | 0  | 1  | 1  | 1  | 0  | 1                   | 0  | 0  | 0  | 1  |
| 19          | 0                    | 0  | 0  | 1  | 1  | 1  | 0  | 0  | 1                   | 0  | 0  | 1  | 0  |
| 20          | 0                    | 0  | 1  | 1  | 1  | 0  | 0  | 0  | 1                   | 0  | 0  | 1  | 1  |
| 21          | 0                    | 1  | 1  | 1  | 0  | 0  | 0  | 0  | 1                   | 0  | 1  | 0  | 0  |
| 22          | 1                    | 1  | 1  | 0  | 0  | 0  | 0  | 0  | 1                   | 0  | 1  | 0  | 1  |
| 23          | 1                    | 1  | 0  | 0  | 0  | 0  | 0  | 1  | 1                   | 0  | 1  | 1  | 0  |
| 24          | 1                    | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 1                   | 0  | 1  | 1  | 1  |
| 25          | 0                    | 0  | 0  | 0  | 1  | 1  | 1  | 1  | 1                   | 1  | 0  | 0  | 0  |
| 26          | 0                    | 0  | 0  | 1  | 1  | 1  | 1  | 0  | 1                   | 1  | 0  | 0  | 1  |
| 27          | 0                    | 0  | 1  | 1  | 1  | 1  | 0  | 0  | 1                   | 1  | 0  | 1  | 0  |
| 28          | 0                    | 1  | 1  | 1  | 1  | 0  | 0  | 0  | 1                   | 1  | 0  | 1  | 1  |
| 29          | 1                    | 1  | 1  | 1  | 0  | 0  | 0  | 0  | 1                   | 1  | 1  | 0  | 0  |
| 30          | 1                    | 1  | 1  | 0  | 0  | 0  | 0  | 1  | 1                   | 1  | 1  | 0  | 1  |
| 31          | 1                    | 1  | 0  | 0  | 0  | 0  | 1  | 1  | 1                   | 1  | 1  | 1  | 0  |
| 32          | 1                    | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 1                   | 1  | 1  | 1  | 1  |



**aP89042 , aP89021 & aP89010 --- Sampling Rate vs Rosc**

| <b>Sampling rate</b> | <b>Rosc</b> | <b>Sampling rate</b> | <b>Rosc</b> |
|----------------------|-------------|----------------------|-------------|
| 4.90 K Hz            | 300K        | 10.42 K Hz           | 150K        |
| 5.26 K Hz            | 290K        | 11.00 K Hz           | 140K        |
| 5.88 K Hz            | 280K        | 11.76 K Hz           | 130K        |
| 6.09 K Hz            | 270K        | 12.50 K Hz           | 120K        |
| 6.33 K Hz            | 260K        | 13.33 K Hz           | 110K        |
| 6.67 K Hz            | 250K        | 14.51 K Hz           | 100K        |
| 6.85 K Hz            | 240K        | 15.63 K Hz           | 91K         |
| 7.14 K Hz            | 230K        | 16.95 K Hz           | 82K         |
| 7.46 K Hz            | 220K        | 18.18 K Hz           | 75K         |
| 7.70 K Hz            | 210K        | 19.23 K Hz           | 68K         |
| 8.06 K Hz            | 200K        | 20.83 K Hz           | 62K         |
| 8.47 K Hz            | 190K        | 22.22 K Hz           | 56K         |
| 8.93 K Hz            | 180K        | 23.81 K Hz           | 51K         |
| 9.26 K Hz            | 170K        | 25.00 K Hz           | 43K         |
| 9.80 K Hz            | 160K        |                      |             |