DVTR-680 Operation theory

1) Power supply:

When battery is installed, the voltage will be converted with U8 (AIC1612) to 3.3V which provide regulated voltage for peripherals IC. During standby mode U8 to be shutdown by MCU EM78811 via 74HC373.

When plug in USB jack or external DC power, the battery will be switched off by Q5 for saving battery power.

For power saving during operation, DSP_SDOWN, AUDIO_PDOWN pin should be turn off when the unit is not active.

2) Beep tone:

Tone sent out at each key press from DTMF pin via R55, Z1, C15, R51 to power amp U1 which is enabled with logic high by AUDIO_PDOWN pin.

3) Reset:

Q12 is the reset circuit for host MCU, the slave DSP is reset by MCU host with pin DSP_RESET. The USB chip to be reset by itself with C50.

4) Host controller and DSP:

The communication between host controller (EM78811) and DSP (MX93L551L) is link up by pin HCS, HCLK, HRACK, HWACK and HDB0~7(P60~P67). Key scan is done by sharing Port P60~P67.

The Flash memory (U4) is directly controlled by DSP with pin CLE, ALE, WE, WP, CE1, RE, RB and ED0~ED7.

74HC373(U7) as a I/O expander for controlling peripheral circuits, such as audio enable , battery detection, converter shutdown, Docking audio enable, MIC power enable, DSP reset and LED control.

5) USB detection:

When plug the unit to docking (docking is connected to PC), CN1 (pin10, 9), or P64 is triggered, MCU acknowledged docking is connected. Voltage of USB_PWR_DET pin changed from 0.8V to 1.5V. MCU sent command to enable USB oscillator via Q4 and USB chip.

6) Battery Check:

This feature is designed to calibrate the built-in software battery voltage Meter, range from 1.80 ~ 3.2V, tolerance is 0.05V, R49 or C56 should be adjusted so that the meter is accurate.

Entry sequence:

While unit is in normal mode, press and hold[volume -] button for 10 seconds.The LCD will show BATT:3.00V which will vary according to battery condition, to exit this mode, press [STOP] button.

7) Flash memory format:

This operation will erase all data and information in recorder, it is a maintenance mechanism only for manufactory and trouble-shoot.

Press and hold [Enter/Index] button for five seconds, LCD display" FLASH FMT", then press Enter/Index button once more for formatting the flash contents. (all messages will be erased). But the setting of Alarm Play and Timer Rec remains unchanged.

8) Docking. Station:

When the main unit is plugged to docking station, CN2, pin10, Pin9, D3 trigger MCU(EM78811) which sense the docking is connected properly. At the same time MCU send signal to turn off MIC_POWER pin and turn on DOCK_CTRL pin via 74HC373 preparing for telephone recording.

T1 is audio couple transformer leading telephone signal to the recorder. If 6V external power is plug in, internal battery is switched off by Q5, Q13 act as regulator to provide voltages for docking and main unit's operation.

9) EEprom:

There are two eeprom IC includes in this circuit. The XL93C46 is for keeping the USB ID. The AT24C128 is for storing index data.

10) Recording:

Mic to Q6 to U2(DSP) which controlled by U20(MCU).

11) Playback:

Get data from U4 with U2(DSP) which controlled by U20.Audio signal from U2 to C14 to U1(Amp) to U5(Speaker).

12) File transfer from recorder to computer via USB:

Data from U2(controlled by U20) to U11(USB controller) to U13(USB JACK) via USB cable to computer.