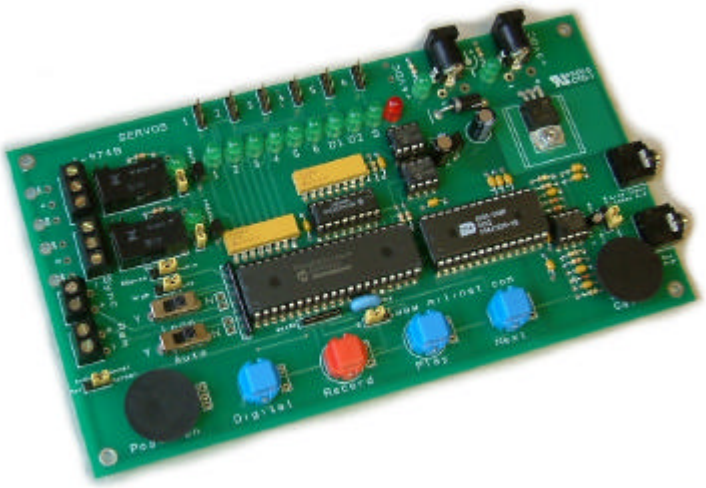
MILFORD INSTRUMENTS Ltd

Wizard 11 Card (Part Number 1-974)



The **Wizard 11 Card** will record and playback up to 6 minutes of action for up to 6 servos and 2 digital outputs. It also incorporates a 4-minute audio recording/playback chip and the ability to control one servo channel either from recorded moves or from an audio signal.
The card includes features such as looping action with variable delay between loops, auto start-up on power up and a connection interface for a PIR, remote switch or pressure pad to initiate playback.
Recording sessions are built up on a track-by-track basis- no programming is required.
During recording, all previously recorded tracks are re-played to aid synchronisation.

Wizard 11 Card

- 2 Digital channels- either 0/5V @ 10mA outputs or changeover relay rated 30V @ 2A .
- 6 Servo channels – one channel may be automatically controlled from an audio signal either from the line input or from the on-board sound chip.
- 240 seconds high quality sound chip- digital recording from the line input (ie from a sound card and .wav files).
- Potentiometer to adjust the servo position and the time delay between loops in loop-play.
- Digital ON-OFF, NEXT, PLAY and RECORD buttons
- Record enable/disable jumper
- Eeprom protect jumper
- AUTO-PLAY and LOOP-PLAY switches
- Sync output for multi-card operation
- REMote start option- for interfacing to pressure pads/PIRs etc
- REM polarity select jumper- start on either +5v or 0V condition.
- Action reversing option to the audio channel servo
- Maximum and minimum set points to the audio servo channel

Controls

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Position Potentiometer

Adjusts the position of the currently selected servo (channels 1-6).
Sets the audio channel end stops (see later to access this facility).
Sets the time delay between loops in loop-play- adjustable to between 0 and 65 seconds

Digital KEY
Channels 7 and 8 are digital channels.
Pressing the ON-OFF key will action the currently selected channel output- action is momentary.

NEXT-channel-key

Changes the current active channel for manual movement and recording.
Each key-press selects the next channel- servos 1 through 6, digital 7 and 8 and the sound chip.

PLAY-key

Replays a set of recorded moves.
During playback the channel LEDs will form a bargraph indicating the amount of time used.
A switch may be connected to the REMOTE connector and this will function in the same way as the PLAY-key.
When the moves have finished playing the bargraph-LEDs will go out.

RECORD-Enable Jumper

If the jumper is set at the “E”nabled position, recording will be permitted. Remove to “D”isable recordings

RECORD-key

The RECORD-key has no effect unless enabled by using the RECORD-Enable link.

Press and release the RECORD key to commence recording. Press and release the RECORD key to stop recording.
If the RECORD key is held down during power up, all memory will be erased (takes approximately 20 seconds)- please note that the servo 2 max and min positions will need to be reset when used under audio control after a memory reset. Please refer below.
During recording the channel LEDs will form a bargraph indicating the amount of time used. When the moves have finished playing the bargraph-LEDs will go out.
The recording time used for channel 1 or channel 8 will set the maximum available recording time for all other channels.
Always record channel 1 first. Recording periods for channels cannot be longer than that set for servo channel1.

Examples
1. A Short recording
   Select channel 1 by pressing NEXT-channel-key until the LED1 is lit.
   Press and release the RECORD-key.
   The red record LED will light.
   Action the channel output by adjusting the position control.
   Any previously recorded action on channels 2 through 8 will also play.
   Press and release the RECORD-key at the end of the 4 seconds to end recording.
   The red led will extinguish.

Press the NEXT button to select channel 2 (LED 2 lit).
Ensure the servo 2 jumper is set to the eeprom position
Press and release the RECORD-key – the record LED lights.
Rotate the position control to action channel 2
The recording will end automatically after 4 seconds.
Select channel 3 etc.

2. A Full-length recording
   Select channel 1 using the NEXT-channel-key.
   Press and release the RECORD-key.
   Action the channel output by rotating the position control.
   Any previously recorded action on channels 2 through 4 will also play.
   Recording will end when memory is full.
   Select channel 2.
   Press and release the RECORD-key.
   Rotate the position control to action channel 2
   Recording will end when the memory is full.
   Select channel 3 etc.

LOOP-Play-switch

To make the **Wizard 11 Card** play the recorded moves repeatedly, move the switch to 'Y'. The moves will start to play when the PLAY-key is pressed. There will be a pause at the end of playing (determined by the position control) after which the moves will start again.
To record moves, the LOOP switch must be set to 'N'.

AUTO-Play-switch

If switched to 'Y' then the moves will be replayed automatically on power-on or Reset.
To record moves this switch must be set to 'N'.

Pause between play loops

When the **Wizard 11 Card** is set to looping play, the length of the pause between repeated playings may be set by the position control.
Turn the position control anti-clockwise for the minimum delay (0 seconds) and clockwise for the maximum delay (approx 65 seconds).

Sync Output

The Sync output enables multiple cards to be linked together. The card produces a negative going pulse of duration 50msecs every time a record or playback session is selected. This pulse can be used to trigger additional cards by connecting the SYNC output to the REM terminal of other cards.

REMote Input

Connection point for external pressure pad/switch/PIR etc to begin the playback action.
To begin playback when the input line drops from +5V to ground, set the **Rem-polarity** jumper to the L position. To begin the action when the input goes from ground to +5V (ie a Sync pulse) set the **Rem-polarity** jumper to the H position.

Servo 2

Set the jumper to the eeprom position to record and playback moves from the eeprom in a similar manner to channel 1.
Set to audio to control the actions of servo 2 from an audio signal.
When set to audio, the audio signal generated either by the on-board sound chip or a suitable line input signal is sampled and used to control the servo movement. This feature is particularly useful for "mouth" servo operation as it requires no special synchronisation with a sound source.
Use the source jumper to select either from the on-board chip or the line input.

Using Servo 2 with an audio control signal

After a memory erase operation, it will be necessary to re-set the maximum and minimum travel positions for servo 2 under audio control- if servos 2 appears not to be moving under audio control then you have probably not set the limits.

Select the required audio source (on-board chip or line input)
Set the travel end points for the servo- Press the **Next** switch and apply power to the board. LED 'S' will start to flash and servo 2 can be controlled by the position potentiometer. Set the servo to one end of the required travel range. Press the **Digital** button.
LED 'R' will now flash- adjust the servo position to the other end of its limit and press **Digital**. LED 'R' will extinguish and the programme start as normal (ie LED 1 will light).

The two limit positions have been stored and will limit the travel of servo 2 when responding to audio signals. There is no requirement to select the limits in any order- the software sorts them correctly.

The degree of servo movement is governed by the Gain preset- rotate clockwise for maximum signal gain and maximum movement.

Audio-channel jumper

Setting the jumper to the reverse position will cause the action of servo 2 to be reversed – ie operate in the reverse direction.

Maximum Recording time

The maximum recording time is 4 minutes for the sound chip and 6 minutes for the servo and digital actions.

Audio

Inputs

Up to 4 minutes of audio may be stored in the on-board chip. The input sensitivity is 320mV P-P for maximum recording volume.
Servo 2 may also be driven directly from the line-input socket, bypassing the on-board chip by setting the jumper to the 'Line' position.

Outputs

The output from the on-board chip is amplified and presented at the 2-way terminal block to allow connection of a small speaker (minimum impedance 8 ohms).
The output may be amplified by an external amplifier if required by connection to the line-output socket. The maximum output from the line-out socket (into a high impedance) is 2V P-P.

Digital Outputs

Pressing the Digital button will set high the currently selected digital channel. Select the other digital channels by pressing the NEXT button.
Press and release the RECORD button to begin the recording session. Press and hold the Digital button whenever you wish the digital output 1 to go active (+5V).

The jumper nearest the terminal block may be used to disable the relay.
With the jumper in place, the output will control the on-board relay. This is a change over relay rated at 30V @2A. The switch contacts are brought to the 3-way terminal block by the relay.

With the jumper removed, the relay is not activated and the output (0/5V at up to 10mA) may be taken from the 2-way jumper pins marked +/- by the side of the channel LED.

Power Supply

The **Wizard Card** requires twin power supplies: 9V DC @ 0.5A for the electronics and 6V DC for the servos and relays- the current rating will depend on the number and type of servos used. Connection for both supplies is via is a 2.1mm socket, centre positive.