

## MRA ObjTrack-11

### FPGA IP-CORE FOR AUTOMATIC TRACKING OBJECTS IN VIDEO

MRA Digital's ObjTrack-11 FPGA IP core implements the algorithm of automatic tracking of objects in video and calculation of their parameters for solving guidance and target designation tasks. ObjTrack-11 IP core is a stand-alone module easily integrated into projects based on field-programmable gate arrays (FPGA) and application-specific integrated circuits (ASIC). The core interfaces are standard and allow for connection to IP cores. The use of the ObjTrack-11 IP core will allow you to create your own effective machine vision systems for solving problems in fire control, weapons guidance and perimeter control with a significant reduction of the development time.

#### FIELD OF APPLICATION



The IP core can be used in smart sights, portable and stationary target acquisition systems, unmanned aerial vehicles, weapon stations, fire control systems, anti-aircraft complexes and homing heads.

#### HOSTING PLATFORMS AND COMPATIBILITY

ObjTrack-11 IP Core is FPGA agnostic and therefore can be used in any FPGA based system. In addition, the core is designed to be easily adapted for use in application-specific integrated circuits (ASIC). Owing to easy integration, fast prototyping is possible for evaluation of the IP core performance characteristics.

#### DELIVERY AND REQUIRED RESOURCES

The ObjTrack-11 IP core is supplied as VERILOG file with description of input/output ports for Altera® Quartus IDE system. Below is an example of the resources required. Contact us for more details.












Parameter	Utilization of resources
LUT	38685
FF (Registers)	45146
BRAM	82
DSP	116

#### PROCESSING TIME FOR A SINGLE FRAME

Results for 150 MHz project frequency

Size of tracking strobe (WxH)	Time, ms
128x128	25
128x64	13
64x64	6.5
64x32	3.5

#### MAIN CHARACTERISTICS

-  Tracking up to 80 fps at core clock frequency 300 MHz and object size of 128x128 pixels.
-  The library implements 1 tracking channel. If several channels are required, several cores need to be used.
-  Tracking of objects is possible in the size range from 8x8 to 128x128. Channel parameters can be changed in times of tracking.
-  Tracking is possible for all types of objects of any shape. There is no tracking collapse if up to 50% of object area changes over no less than 50 frames.
-  Tracking when an occluded overlaps up to 50% of object area. Tracking collapse is automatically detected and the object is re-captured after detection.
-  Discreteness of coordinate calculation is not less than 1/256 pixels. Discreteness of motion speed calculations is no less than 1/256 pixels/frame.
-  Tracking of dynamic objects. Possible translation of object over 1 frame is by 52 pixels in any direction.
-  Tracking of low-contrast objects against a complex background. Tracking of objects with a contrast from 10% is possible.
-  Calculation of the position and size of object in the tracking rectangle. It is possible to resize the strobe without tracking collapse and object re-capture.
-  Adaptation is possible to your conditions of use (changing of operation modes, control logic, algorithm modification).
-  Easy integration. The core is supplied in a form convenient for use in FPGA IDE systems by leading FPGA manufactures.

#### COMPLEMENTARY OPTIONS

Additional IP cores for video data input/output, telemetry transmission can be supplied for fast development of projects based on the ObjTrack-11 IP core. For the use in projects featuring extremely high frame rate, processing time for a single frame can be reduced 4 fold without significantly increasing the required resources.