

## EF-45NC™ Iris Recognition System

Innovative face-display positioning provides outstanding ease-of-use at capture range of 32 to 45 cm



### APPLICATION

*Compact wall mountable and desktop terminal for access control, time & attendance, and general ID management applications*

### Product Description

The EF-45NC next generation iris recognition system provides unprecedented subject ease of use through a highly innovative and intuitive user positioning approach. Subjects will view their own face in a front-facing, high resolution 5.0 inch color display to position themselves correctly within the real-time graphic interface. They will intuitively and naturally move to the correct position by simply centering and sizing their face image to the box within the display. In addition, the positioning box and the top border turn green to indicate proper distance positioning, after which the iris biometrics images are automatically collected, provided that the real time image quality metrics are satisfied. Vocalized commands give additional positioning guidance in real time.

New for the EF-45NC, a time-of-flight (TOF) proximity and distance sensor is integrated for fast and precise detection of all subjects. The system now features a faster tilt motor, and includes CMITech's

proprietary "deep learning" based face detector algorithm. Together, the system is faster, smoother and even more intuitive than ever before. The deep-learning face detector also enhances operation in bright ambient light for deployment positioning flexibility. Now, capturing highest quality iris biometrics images is fast, simple and fully intuitive for all subjects, including non-acclimated ones.

The EF-45NC operates at an expansive capture range of 35 to 45 cm in enrollment mode. In recognition mode, the capture range is extended to 32 to 45 cm, further increasing positioning flexibility and ease of use.

The system captures high quality face images simultaneously with iris image capture. On board face recognition is optional.

The EF-45NC is an embedded system that includes its own Quad mainboard to manage all face and iris imaging processes.

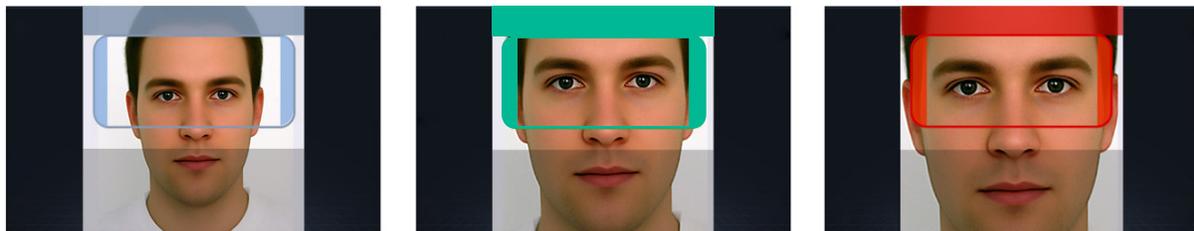
The normal external communication to host systems and clients is through TCP/IP via an Ethernet connection, but USB connectivity to a local PC host is available. The embedded architecture allows for on-board iris and face template generation and matching against a local data base. The EF-45NC is offered in two basic hardware configurations: the AC version is for physical access control (PACS), time & attendance and similar applications, and includes an embedded MiFare card reader, a wall mount bracket and a full set of I/O connectors; the ID version is for general identity management applications and does not include the card reader or the full connector set.

The EF-45NC is fully backward compatible with the prior generation EF-45 system, which means that no API changes are required for systems integrators.

## Innovative, Intuitive Subject Positioning

The EF-45NC's TOF sensor detects subjects from over 1.0 meter from the system; the subject's face is immediately displayed on the 5.0 inch high resolution color display. For proper positioning, the subject will naturally center his face by simply making his or her face fit the positioning "guide box". Vocalized instructions also command the user to move forward or back to get into range. When in the proper range, the guide box and top border turn green, indicating to the subject to stop and wait until the image capture process is completed. Like a smart phone "selfie" image, this interface is highly intuitive, with typical capture times of 0.5 seconds from proper positioning.

### Color visual cues for proper distance positioning



**MOVE FORWARD**  
Blue for too far away.



**GOOD**  
Green for OK!



**MOVE BACKWARD**  
Red for too close.

# Key Features

## Feature

State-of-the-art optical design

Advanced, proprietary stereoscopic eye localization

Highest image quality

Compact, lightweight design

Simplest of user instructions

Stand-off distance and depth of capture in enrollment mode

Extended depth of capture in recognition mode

Real time image quality metrics

## User Advantages

The optical design includes utilizing highest quality optics and very fast shutter speeds, which allows the systems to exceed industry standards for image quality.

The EF-45<sub>NC</sub> accurately locates the position of both eyes in 3D to optimize subject ease of positioning and iris image quality. This function enables the fast and reliable subject distance positioning indicators shown as blue, green or red color distance positioning codes.

Meets or exceeds the ISO 19794-6 2011 and ISO 29794-6 iris imaging specifications.

Optimizes placement or mounting options, including wall, swing arm, or eGate mounting solutions.

Very simple and repeatable subject instructions:

- Position face within guide box in display (like smartphone “selfie”)
- Move toward the system to size head to box
- Once within range, the box and indicator bar will turn green to indicate proper positioning

Capture is automatic once subject is in proper position and real time image quality metrics parameters are met.

35 to 45 cm, ensuring robust, fast and easy positioning. Comfortable range for subjects in wide variety of desktop, countertop, kiosk or wall mount placements.

Depth of capture can be extended to a range of 32 to 45 cm in recognition mode (not necessarily ISO compatible). Intended for small to medium scale access control deployments. Selectable in SDK.

Image quality metrics included in capture algorithm:

- Subject gaze angle (i.e. whether the subject is looking directly ahead at the imager)
- Subject motion
- Focus
- Usable iris area (occlusion)

# Key Features

## Feature

Face image capture

## User Advantages

A face image is always collected at same time as capture of iris images, so that the data record consists of one face image and two iris images.

*Note: the face images do not qualify as ISO standard, and therefore are not intended for large scale face recognition purposes. They are intended for small scale face recognition and manual verification of the subject's identity. Face images also remain in the log file to visually verify who was authenticated.*

Face recognition

Optional. Contact CMITech for algorithm selection and pricing.

Very wide interpupillary distance range

The wide interpupillary distance range accommodates all adults and young children, making it ideal for large scale, public authentication programs.

Large on-board data bases for on-board identification and authentication

Standard on-board (local) iris data base of 100,000 subjects (iris template-pairs), with matching speed of about 0.5 second in 1:N mode.

Template-on-card

Supported for MiFare and DesFire cards

Cable connectors

For AC version, plug-in connector kit for all cabling (except RJ-45 Ethernet) included in accessories package.

WiFi

Optional, field installable WiFi dongle for ease of networking installation. (Contact CMITech for WiFi dongle specification for each country).

Card reader

Standard in AC version only: embedded MiFare card reader for support of dual factor authentication, or backup authentication for special case users.

Language support

Display languages of English, Korea, Traditional Chinese, Simplified Chinese, Japanese, Spanish, Italian, Arabic, and Russian.

Vocalizations for positioning can be modified by local systems integrators through modification of on-board .wav files.

# Technical Specifications

Embedded CPU	Quad Cortex-A55, 2GHz
On-board Iris algorithm for encoding and matching	Standard in all configurations
Flexible Software Development Kit (SDK) configurations	High Level SDK's offered in C# (.NET) and C++ versions. Includes host side reference application to connect to EF-45 resident services layer so that integrator does not need to program EF-45 device.
Configuration Utility software application	This host side software application provides centralized (network) control and setup of system configuration, Wiegand settings, and IP address settings, as well as providing for centralized FW upgrades.
Compatibility with prior generation EF-45	Fully backward compatible to prior SDK versions for the EF-45, which means that no API changes are necessary when installing in legacy solutions.
Dimensions	166 x 166 x 43 mm (6.5 x 6.5 x 1.7 inches) without mounting wall plate
Weight	630 g without wall plate
On-board data storage	Standard: 100,000 iris template pairs with match speed in 1:N mode of about 0.5 second.
Dual factor authentication	Iris with either smart card and PIN as second factor
Iris image pixel resolution	Meets ISO 19794-6 2011 and ISO 29794-6 iris imaging standards
Iris image output	640 x 480 pixels, 8 bit depth, supports multiple formats
Adjustable FAR (false accept rate)	Adjustable iris algorithm threshold range of $10^{-5}$ to $10^{-14}$ FMR at $10^{-6}$ FNMR. Default is $10^{-8}$ .
Enrollment mode operational iris imaging distance (stand-off range) and depth of field	35 to 45 cm range (7 cm depth of capture range) in enrollment mode. Meets ISO 19794-6 2011 and 29794-6 specifications.
Recognition mode operational iris imaging distance	Recognition mode provides up to 32 to 45 cm range (13 cm depth of capture) for small scale applications. Does not necessarily meet ISO specifications. Range selectable in SDK.
Iris positioning indicators	Face positioning within box in LCD serves to center users face in X-Y dimensions.  Subject will fit size of face to box size within LCD display for distance (Z) positioning, with simultaneous color bar display for correct distance positioning: Blue: too far away Green: OK Red: too close  Supplemental voice distance feedback also simultaneous. Vocalizations convertible to local language via .wav file substitution.
Auto tilt	Internal auto tilt range of +25 to -20 degrees, which corresponds to height range of approximately 40 cm. System can be mounted at any height to accommodate local user population.  Contact CMITech for mounting recommendations.

Time of iris image capture	Typically about 0.5 second from time the subject's eyes are properly placed within capture volume.
IR illumination for iris imaging	Typically 0.5 second from time the subject's eyes are properly placed within capture volume.
IR illumination for iris imaging	Dual wavelength LEDs (spectral range of 700 to 900 nm) that conforms to ISO best practices for iris imaging.
Face image capture	Standard 24 bit color and NIR images, both accessible from SDK
Face recognition	Optional on-board encoding and matching
Audio	24 bit, 1 W embedded speaker Line-out connector for external speaker
Operating temperature range	0 to 45 °C
Humidity range	10 to 90% RH, non-condensing
Illuminator eye safety standard	IEC 62471
Network interface , standard	10/100 Base-T Ethernet (RJ45 connector)
RFID Card reader	Integrated CMITech MiFare / DesFire reader (in EF-45 AC version only)
Mounting	¼ - 20 UNC (consumer camera tripod mount type) standard
Kensington lock slot	Standard
Physical access control (EF-45AC) version accessories	Detachable wall mount plate for easy wall installation. Terminal and wired connectors for: Wiegand in/out, RS-232, RS-485, 2X TTL (GPIO) inputs, 1 dry contact relay
ID management (EF-45ID) version accessories	Terminal and wired connectors for: RS-232, RS-485, 2X TTL (GPI), 1 dry contact relay
Power supply requirement	Input 12V to 24V DC, 3.0A. AC power adapter included in all versions.

## Contact

CMITech Company, Ltd.  
5th Floor, 38 Burim-ro, 170Beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do,  
14055, Republic of Korea

Tel : +82.70.8633.8277

Fax: +82.31.624.4490

Contact: sales@cmi-tech.com

CMITech America, Inc.  
2033 Gateway Place, Suite 500  
San Jose, CA 95110 USA

Tel: (1) 408 573-6930

Copyright 2020 CMITech Company, Ltd.—All Rights Reserved.

CMITech Company, Ltd. reserves the right to make changes to specifications and features shown herein, or discontinue the product described at any time without notice or obligation.