

Perm Augmentation

Access Card Whitepaper

--DRAFT--

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Executive Summary

We are moving to alphanumeric perm identifiers for UC Santa Barbara students and applicants as part of the [Perm Augmentation Project](#). However, the current Access Card configuration will not support alphanumeric identifiers. In order to support alphanumeric perm identifiers, we propose the following changes to the Access Card:

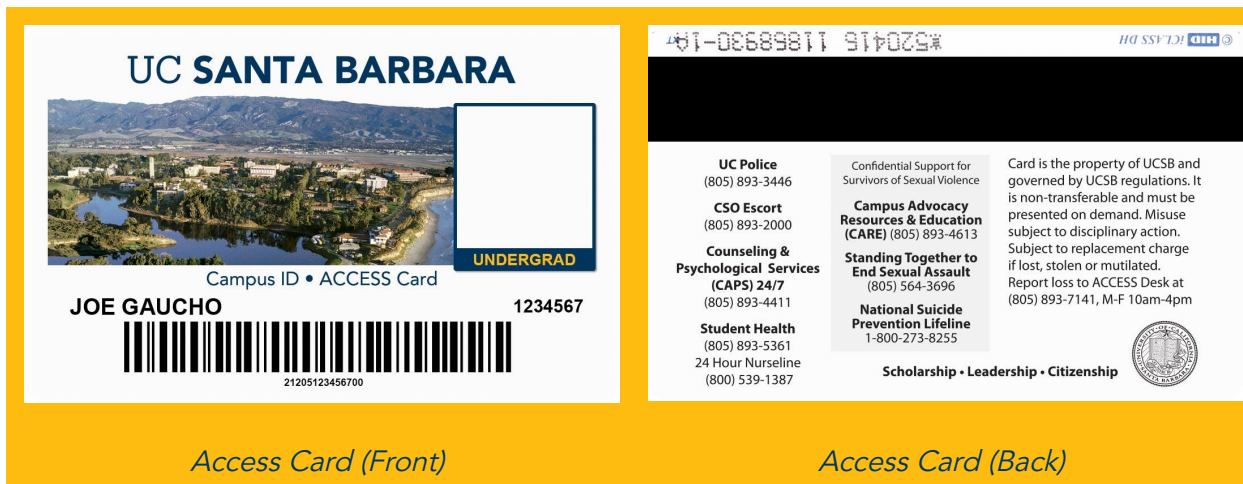
- **Barcode:** Update the barcode font from Codabar to Code128 on the front of the Access Card. Minimal impact: most scanners should continue to work with little or no additional configuration.
- **Magnetic Stripe:** Update the magnetic stripe to be blank for students by default, and contain either an employee ID (for employees and student-employees) if they are an employee. Medium impact: will not allow for students to purchase with swipe functionality nor other tools using perm for swiping to be able to access the perm from the magnetic stripe. Students will have to go back to the Access Desk after getting a job on campus in order to have their employee ID encoded on their card.
- **Near Field Communication (NFC) Chip:** Add an additional NFC chip to the Access Card that can be used for NFC payments. Will require new Point of Sale (POS) systems. This is already scoped into the Transact replacement project.

Background

What is an Access Card?

An Access Card is the campus identification card used at UC Santa Barbara for students, staff, and faculty. On the front of the card, there is a picture of the individual, their identification number, and a barcode with their ID information encoded. On the back is a magnetic stripe, which also has their identification number (perm for students, and employee ID for staff and faculty) stored on it, and is used for obtaining their identification number by swiping the card (e.g., at a Point of Sale system). Lastly, there is a NFC chip in the card that grants access to campus buildings.

- The magnetic stripe is used for payment: students and employees can load money on their cards, and use them around campus (and in a few places in Isla Vista) for payment, as well as identification purposes (e.g., event attendance), and in some places, clocking into and out of work on a Kronos time clock.
- The barcode is used primarily by the library for loaning books, but is also used in some places for identification purposes (e.g., event attendance).



Access Card (Front)

Access Card (Back)

Problem Statement

Access cards are used on campus by staff and faculty as their primary identification card in relation to campus. These cards have the individual’s identifier (perm for students, employee ID for staff) on the card in three places:

- Printed under the picture of the individual on the front of the card
- Encoded on — and written underneath — a barcode on the front of the card
- Stored on the magnetic stripe on the back of the card

The primary challenges with the current Access Card configuration are that the font currently used for the barcode cannot store alphabetical values, and the magnetic stripe on the back of the card is unable to store alphanumeric values. This document proposes solutions to both of these primary issues.

Definition of Terms

Term	Definition
Access Card	The Access Card is the student and staff identification card at UC Santa Barbara. It contains information about the individual on a barcode on the front, and on a magnetic stripe on the back. It also has a chip inside that is used for campus building access.
Near-Field Communication (NFC)	Near-field communication (NFC) is a set of communication protocols for communication between two electronic devices over a very short distance (1.5 inches or less). It is used for purposes such as building access, payment (e.g. ApplePay or GooglePay), etc. Current Access Cards have an NFC chip that is

	used for campus building access.
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Proposed Approach

The proposed approach to adding support for alphanumeric perm numbers to Access Cards is:

1. Update the barcode on the front of the card to use a new barcode font that has support for alphanumeric characters (specifically, moving from codabar to code128).
2. Leave the magnetic stripe blank by default for students, and store the employee ID on the magnetic stripe for employees and student-employees.
3. Add a new Near-Field Communication (NFC) chip to the card, which will allow for payments to be done via NFC
 - a. *Note: students paying at point of sale systems with new cards will not be able to use the magnetic stripe, and must instead use the NFC payment functionality.*
4. No changes will be made to the existing cards that will impact building access, which uses a separate NFC chip from the one described in (3) above.

Barcode Changes

The proposed barcode changes are the most straightforward:

1. Change the barcode font from Codabar to Code128
 - a. This will allow alphabetical characters to be represented on the barcode, in addition to the standard numerical values.
2. All identification numbers (employee Identifiers and perm identifiers) would continue to be prepended with a value of '21205' (as has been done historically) for consistency.

Barcode Examples

Below the table shows three different types of identifier (Employee ID, Perm, and Alphanumeric perm), and what the value looked like on the old card, and what it would look like on the new card. Note that there is no difference between the numbers for Employee Ids and all-numeric Perms. The only difference is that Code128 can include alphabetical characters, whereas Codabar cannot.

Id Type	Id Value	Codabar (Old) Barcode Value	Code128 (New) Barcode Value
Employee Id	12345678	2120512345678	2120512345678
Perm	123456	2120512345600	2120512345600

Alphanumeric Perm	A23456	N/A	21205A2345600
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Magnetic (Mag) Stripe Changes

Mag Stripe Constraints

The following constraints limit the flexibility of our solution to represent alphanumeric perms on the magnetic stripe of Access Cards:

- Values on the mag stripe must stay on Track 2 to work with existing Point of Sale and Timekeeping hardware.
- Transact does not allow alphabetical characters in the primary identifier field.
- Track 2 on the magnetic stripe cannot store alphanumeric values.

Proposed Changes

The proposed change is to leave all magnetic stripes for students blank by default. If/when a student becomes an employee, if there is a need for them to have their employee ID on their access card (e.g. they must clock in and clock out using their access card on a Kronos time clock), the student will return to the Access Desk, where they will have their card updated to include their Employee ID on their card. This will only need to be done once, after the student receives an employee ID.

The impact of this change is as follows:

1. Students receiving the new cards will not be able to make payments via swiping those cards at Point of Sale terminals. They will instead have to use the NFC chip for payments at those terminals.
2. Anyone using swiped cards to collect student perms will have to switch to another methodology (primarily a bar code reader) instead.

NFC Chip Changes

No changes will be made to the existing Lenel chip used for building access on campus. New Access cards will, however, have an *additional* chip that will be used for paying via NFC at Point of Sale terminals.

Questions and Answers

Question	Answer
Why can't we use alphanumeric	There are several reasons that combine to make this

<p>values on the Access Card's magnetic stripe?</p>	<p>not a viable option:</p> <ul style="list-style-type: none"> ● Our current Kronos time clocks require a swiped card to have its data stored on Track 2 <ul style="list-style-type: none"> ○ Kronos cannot store alphanumeric values in the field used to match an individual with the card they have swiped, so the value on Track 2 cannot be alphanumeric. ● The Transact Point of Sale systems (used around campus and in the Isla Vista community) can only read from Track 2 ● Track 2 on the magnetic stripe cannot store alphabetical characters ● The latest version of the Transact Point of Sale system itself only allows numeric values in its Primary ID field <p>Because of the combination of these constraints, it is not possible to store alphanumeric values on Track 2 of the magnetic stripe. It is also why we cannot use one of the other tracks on the magnetic stripe (there are three in total) to store the alphanumeric perm.</p>
<p>Why can't we use multiple tracks on the Access Card magnetic stripe for different types of values/identifiers?</p>	<p>There are several reasons that we are not able to use different tracks on the magnetic stripe to hold different values:</p> <ul style="list-style-type: none"> ● Our current Kronos time clocks require a swiped card to have its data stored on Track 2 <ul style="list-style-type: none"> ○ Kronos cannot store alphanumeric values in the field used to match an individual with the card they have swiped, so the value on Track 2 cannot be alphanumeric. ● The Transact Point of Sale systems (used around campus and in the Isla Vista community) can only read from Track 2 ● Track 2 on the magnetic stripe cannot store alphabetical characters ● The latest version of the Transact Point of Sale system itself only allows numeric values in its Primary ID field <p>Because of the combination of these constraints, it is not possible to use an alternate track on the magnetic stripe to solve this problem.</p>

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Appendix 1: Sample Barcodes

Codabar

Code128