

3230202A - Automated Student Registration
Using Touch-Tone Telephone/Voice
Response An Application Note

PAGINATION SHEET

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Using
Touch-Tone Telephone/
Voice Response

An Application Note

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SECTION 1: WHAT IT IS AND HOW IT STARTED

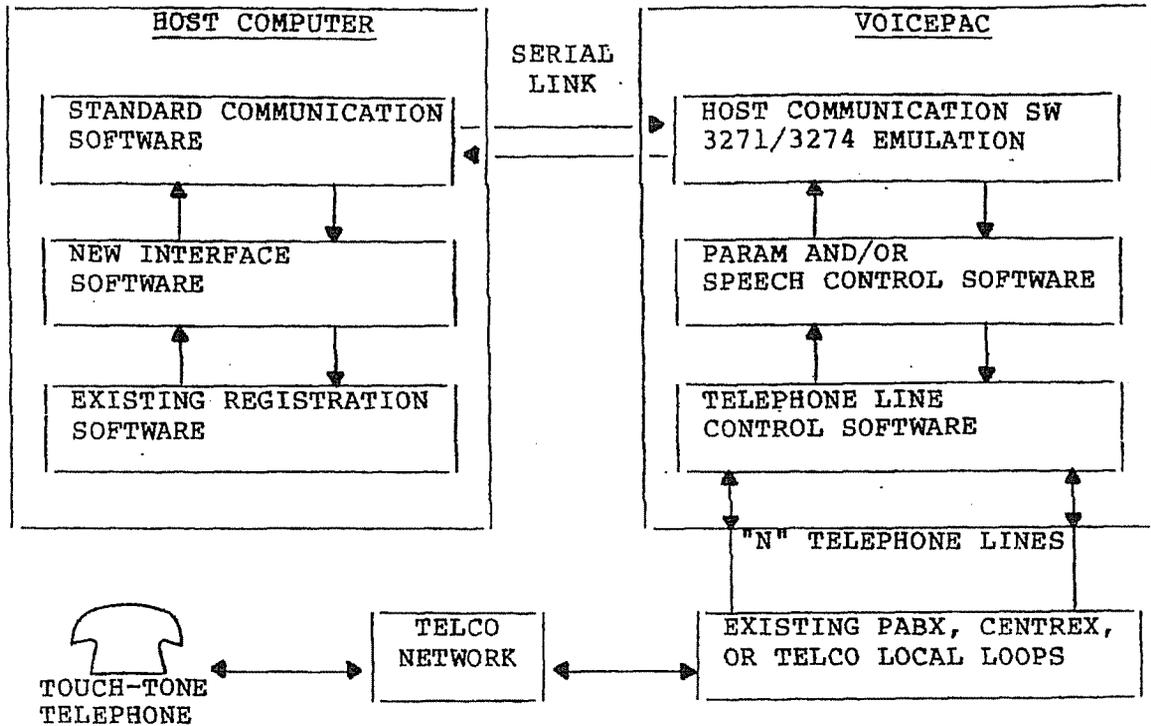
Automated student registration through Touch-Tone telephone/voice response is the most exciting innovation since the computerization of the registration process. All pre-authorized students are given the ability to choose, add or drop courses from any Touch-Tone telephone - anywhere! Each transaction is automatically prompted and confirmed by computer controlled spoken messages. An interface between your existing computer system and the telephone network is provided by a Voice Response System and appropriate software. This technique is compatible with both on-line and batch systems, as shown in Figure 1-1.

Touch-Tone telephone registration is usually supplemented by continued availability of walk-in registration for those situations requiring staff attention.

The use of Touch-Tone telephone/voice response for on-line transactions was pioneered by Periphonics during the early 1970's in the banking industry. The technique has since spread to distribution, transportation, manufacturing and many other industries. During 1983, Periphonics visited a great many colleges and universities to suggest application of voice response for their student registration. We were initially disappointed by the reaction, since only Brigham Young and Georgia State (GSU) actually proceeded with trial systems. However, during 1985, a dramatic change took place; with a great many schools implementing or planning voice response systems.

The level of interest in Touch-Tone telephone registration was demonstrated by the large number of people who attended a conference on "Teaching Registration to Talk" at GSU on December 2 and 3, 1985. About 250 people, representing more than 90 schools attended this Conference. At the final session, the Chairman asked the audience for a show of hands to indicate expected implementation during the next two years; the response was almost universally positive.

Figure 1-1



How it Works:

Callers are answered in a clear, pleasant, human voice that is stored and controlled by the VoicePac system. The system's voice prompts the caller through the input process by asking for appropriate information. The caller enters information via the push-buttons on the telephone keypad. After verifying the information and passing it error-free on to the processing cycle, the system can even assign a tracking or audit number (if desired). The system can even transfer telephone calls automatically to a human operator when the caller enters invalid information several times or requests help. The flow/logic of the transaction is controlled by your existing application software. A new interface program must be created on your Host computer to format messages to and from the VoicePac.

SECTION 2: BENEFITS FOR THE STUDENTS AND THE SCHOOL

Student convenience is dramatically improved. The long lines, extra time, and resulting frustrations of walk-in registration are eliminated. Many hours are saved compared to traditional registration systems. Also, commuter students avoid a trip; saving time and money. A student survey, taken at Brigham Young University, proved a very positive reaction to Touch-Tone registration, as shown in Figure 2-1.

Faculty members will be pleased with a noticeably reduced add/drop rate after start of classes. Brigham Young University reports a 35% reduction in late registration and a 40% reduction in add/drop after start of classes. Since their instructors individually approve add/drops after start of classes, the voice response system led to a major reduction in this disruption of academic activities.

A substantial cost saving is possible through reduced data entry and other traditional registration expenses.

Georgia State University reports increased course enrollment due to the convenience of the system and the ease of add/drops.

Registration is one of the most visible processes on campus. Schools installing voice response registration systems are receiving publicity in local newspapers and on television. The systems are leading to favorable editorials in student newspapers and high visibility with the University President and/or Trustees.

The same system can easily be expanded for many other applications including: admission status; financial aid status; graduation requirements status; course grade information; ordering supplies; job interview scheduling; storm closing announcement; and many other applications. The only limit is availability of the appropriate data base.

FIGURE 2-1
 BRIGHAM YOUNG UNIVERSITY STUDENT EVALUATION
 OF THE TOUCH-TONE REGISTRATION SYSTEM CHARACTERISTICS
 FOR FALL SEMESTER, 1984

<u>CHARACTERISTIC</u>	<u>% AGREE</u>	<u>% NEUTRAL</u>	<u>% DISAGREE</u>
Very Convenient	95	3	2
Easy to Use	95	3	2
Saves Time	87	9	4
Gives Total Control	83	13	4
Gets Exact Classes	84	12	4
Computer Assistance Getting Complete Schedule	85	12	3
Immediate Feedback	98	1	1
Efficient System	81	17	2
Written Instructions (Easy to Understand)	88	8	4
Written Instructions (Information Complete)	85	10	5
Planning Worksheet Very Helpful	88	11	1
Good Computer Voice	91	7	2
Keypad Symbols Easy to Use	97	2	1

SECTION 3: OVERCOMING POSSIBLE BARRIERS

3.1 Security

Systems implemented to date, assign students a unique four digit access code or "Personal Identification Number" ("PIN"), which is used in addition to their school ID# or Social Security #. This security technique (a unique four digit PIN) is widely used in the banking industry for automated Touch-Tone telephone customer inquiry, funds transfer and/or bill payment. Some of the schools have chosen a less secure operating procedure by allowing the students to use their birth date (month/day) as a PIN.

Reports from schools using birth date as PIN indicate a tolerable level of pranks. Of course the level of such pranks would be reduced a great deal further by utilization of the system's capability for a unique PIN for each student.

Several registrars pointed out that current procedures at most schools, whether walk-in or by mail, offer equal opportunity for pranks and/or abuse.

It is worth noting that use of the Touch-Tone telephone as an input device limits the possible input characters and thereby blocks any attempt to gain access to unrelated and unauthorized areas of the computer program.

3.2 Mandatory Advisement

Some schools require all students to consult with an advisor prior to registration, but this practice does seem to be losing favor.

One means of accommodating mandatory advisement is to have the advisors provide each student with a unique "access code" ("PIN"), at the conclusion of the advisement consultation.

A speaker from BYU at the "Teaching Registration to Talk" Conference, described the process by which the Registrar's organization convinced the school to change from mandatory to voluntary advisement. First, a survey of students showed that 97% considered advisement a nuisance rather than a help. Second, they documented a number of cases where the student's graduation was delayed due to incorrect course selection resulting directly from advisors' instructions. Then they pointed out the substantial amount of time the faculty was investing in advisement with questionable results. Finally, they recommended that students be treated as adults, since they are expected to act as adults. None of the registrars at the Conference seemed to take issue with this story.

3.3 Getting Funds to Pay for the System

A great variety of approaches are being taken to fund these systems. Some schools are considering an extra fee ranging from \$2.00 per term to \$10.00 one time for each student (in some cases, only for those who choose to use Touch-Tone registration).

One school convinced its trustees to approve a special fee by presenting the results of a student survey. A questionnaire was given to each student during walk-in registration which asked the following:

- 1) Do you have access to a Touch-Tone telephone?
- 2) Would you pay a once in your lifetime \$10.00 fee to register by telephone instead of coming to school?

More than two-thirds of the students answered both questions positively. The registrar recommended a one-time fee only for those students who chose to use the system; however, the Board of Trustees chose to implement on-going fee of a few dollars per semester for every student.

At a Florida school, the student government offered to pay a significant part of the cost. Georgia State University demonstrated increased course enrollment that paid for the system. Some schools seek cost reduction through labor savings at walk-in registration and/or reduced data entry.

The real question may not be: "Can you afford it?", but instead may become, "Can you afford not to have it?", according to James E. Greene, Jr., University Registrar at Georgia State.

3.4 Present Registration System Operates in a Batch Mode

Many schools presently have computer systems that process registration in a batch mode with all requests for courses run as the same job. Time, cost, and cultured/"political" considerations may delay conversion to an on-line system.

Although Touch-Tone registration in a batch mode (essentially on-line data entry of course requests) does not offer as many benefits as on-line registration, it can still be attractive. The University of Utah found the following benefits according to Ralph Boren, Associate Registrar:

- More convenient for students.
- Extended hours of operation.
- Ability to call back and make changes.
- Reduced transcription errors by students due to voice response confirmation.
- Data entry work and cost reduction.
- Paperwork and filing reduction.
- Experience and progress toward on-line operation.
- Good public relations and publicity with coverage on local television, local newspapers, school newspaper editorials of praise, and visibility with the University President.

Although Periphonics' VoicePac is normally used with on-line systems, our VoiceStar provides a complete "front-end" for batch systems to work with Touch-Tone voice response; VoiceStar includes a powerful application processor with its own storage and files.

3.5 Limited Availability of Programming Staff for the Project

The amount of programming work necessary to connect voice response systems to existing computer registration systems depends on a number of factors including:

- 1) The type of voice response equipment chosen, and the software utilities provided by the voice response supplier;
- 2) The familiarity of your programmers with your existing registration software;
- 3) The caliber and depth of technical support provided by the voice response vendor; and
- 4) The completeness and clarity of documentation and training provided by the voice response vendor.

Periphonics can greatly reduce the amount of work required to connect voice response systems to existing computer registration systems by means of a demonstration software program to run on IBM Host computers (Series 43XX or 30XX). This demonstration software program serves three useful purposes:

- 1) It may be used as a design reference by your technical staff during their development efforts thereby shortening familiarization time.
- 2) Sections of this program may actually be modified by your technical staff to serve as the linkage between your existing registration software and the voice response system. This potentially could save a substantial amount of work for your staff. Use of this program in your system on a production basis requires a very nominal license fee.
- 3) The demonstration software program is intended to be used to perform certification tests after installation of the voice response system. This will simplify and expedite the testing process.

Should your school not have the appropriate programmers available, Periphonics can help in two different ways. First, we can refer you to a consulting firm that can provide skilled people to work with your staff to write interface software on your main frame computer. Alternatively, Periphonics can develop virtually all the interface software needed to work with your existing software to run on our equipment.

3.6 Impact on Other Departments

"No decision as big as changing a registration system can be made in isolation. Aside from students and faculty and academic advisors, managers of other campus offices must be considered as the decision is made. Hardly any campus office is immune to change in the registration system. A major change, can affect such offices as the Controller, the Housing Office, Financial Assistance, Admissions, Graduate School and even the Bookstore. Managers of these offices must be involved early in the decision process", according to Ruth A. Jass, Registrar, Bradley University.

Internal selling of the system can be helped by identifying the groups who will benefit the most, combined with thoughtful selection of a steering committee. Advocates of the system can describe the benefits other schools have achieved in student convenience, economic gains (through increased course enrollment and lowered cost), and very positive public relations and media coverage.

SECTION 4: IMPLEMENTATION PLANNING

4.1 Estimating the Number of Telephone Lines Required

Several factors influence the number of telephone lines required including:

- 1) The number of students authorized to use the system. Does this number include graduate students, continuing education students, etc.?
- 2) The percentage of authorized students who choose to use the system, which has generally been quite high.
- 3) The number of calls necessary to complete each student's registration, including changes (some schools report walk-in registration requiring an average of 2 visits to complete registration). When full courses are prevalent the average number of calls to complete registration may rise as high as 3 per student, according to Georgia State University. Some other schools have allowed for 4 calls per registration.
- 4) The duration of the average transaction, thus depending on dialogue design, availability of courses, average number of courses per student, and the frequency of obstacles such as unpaid fees, etc. Average call duration has been estimated to be 3 to 4 minutes.
- 5) The number of days, and hours per day, available for registration.
- 6) An appointment scheduling procedure to restrict the starting date and time at which each student can first gain access to the system is recommended. Typically, access is in 30-minute intervals with some schools allowing the student only a 48-hour window between start and completion. Other schools restrict only starting time/date.

The table below illustrates the approach taken by different schools.

School	# of Students	# of Telephone Lines	# of Days for Registration	# Hours/Day Utilized
Bradley University	5,000	8	NA	NA
Brigham Young	26,000	32	21+	12+
Georgia State	24,000	32	21+	12
Metropolitan State	17,000	32	14	16
Utah State	2,574	Avg 12 lines	5	12

TABLE 4-1

<u>SYSTEM CONFIGURATION</u>	<u>ACCEPTED LOAD (P=.05)</u>	<u>CALLS/HOUR</u>
8 lines	3.85 erlangs	57.8
10 lines	5.25 erlangs	78.8
12 lines	7.0 erlangs	105.0
16 lines	10.0 erlangs	150.0
20 lines	13.0 erlangs	195.0
24 lines	16.5 erlangs	247.5
28 lines	19.5 erlangs	292.5
32 lines	22.5 erlangs	337.5
36 lines	26.0 erlangs	390.0
42 lines	31.5 erlangs	472.5
51 lines	39.0 erlangs	585.0
66 lines	52.5 erlangs	787.5
70 lines	56.0 erlangs	840.0

The capacity calls per hour is shown for various system configurations assuming an average call length of 4 minutes and a 5% probability of blocking (busy signal).

TABLE 4-2

TOTAL NUMBER OF STUDENTS REGISTERED
DURING PERIOD OF:

<u>SYSTEM CONFIGURATION</u>	<u>15 DAYS</u>	<u>21 DAYS</u>
8 lines	4,160	5,823
10 lines	5,675	7,945
12 lines	7,560	10,584
16 lines	10,800	15,120
20 lines	14,040	19,656
24 lines	17,820	24,948
28 lines	21,060	29,484
32 lines	24,300	34,020
36 lines	28,080	39,312
42 lines	34,020	47,628
51 lines	42,120	58,968
66 lines	56,700	79,380
70 lines	60,480	84,672

These figures are based on a total of 8 minutes for each student to complete registration (perhaps two 4-minute calls, or one 4-minute call and two 2-minute calls). It has been assumed that the system is utilized at the level shown in Table 4-1 for 4 hours per day and at 70% of that level for another 8 hours per day. Students initial access time should be scheduled and controlled by Host software.

4.2 Dialogue Design

Design of the dialogue is one of the most important factors for the successful introduction of voice response registration.

Prompting messages must be clear and complete but as brief as possible. Wordy prompting messages lead to user dissatisfaction; this has been repeatedly proven by Periphonics over the last 15 years; some of the pioneers in student registration have reproven this through trial and error. One university even experimented with "folksy" dialogue, but soon changed in favor of brevity.

Brief, but adequate, prompting messages make a dramatic improvement in the speed and capacity (# of completed registrations per hour) of the system. Well-designed systems also provide "help messages" in response to an "assistance or help code" input.

It is important that the script include messages for all "go wrong" possibilities in the registration process.

A sample dialogue is shown in Attachment A to this publication.

4.3 Vocabulary Size and Future Growth

Most schools find a vocabulary of 256 to 480 seconds adequate for their registration needs. The difference depends primarily on whether the system will speak course/department names or spell out alphabetical abbreviations.

Periphonics standard configurations for student registration typically come equipped with 448 seconds (about 900 words) of vocabulary storage in the system. This may be expanded in 32-second increments up to a total of 896 seconds, about 1800 words. (At some point dependent on configuration, an expansion chassis is required.)

4.4 Vocabulary Recording and Changes

Periphonics offers a wide range of choices for recording and/or changing vocabulary.

- a) Periphonics Master Vocabulary for Student Registration (MVSR) is available on floppy diskette. This MVSR is similar to the Metropolitan State College dialogue expanded to include a selection of other phrases and over 100 course/department names; it also includes dialogue for credit card payment of fees. The price of the MVSR includes custom recording of the school name (one name only). The MVSR includes a choice of phrases so that items may be selected to reside in the system; this can be accomplished at the factory, or the school may select (or change) phrases on site by using the PAVE Vocabulary Editor utility.

The MVSR is available in either a male or female voice.

Additions to the master vocabulary can be ordered on a custom recording basis. Delivery time for such changes/additions is typically six to eight weeks; more rapid delivery is often possible in emergency situations.

- b) Periphonics can custom record the entire vocabulary if you have unique requirements.
- c) The school can record the entire vocabulary with a local voice of your choice. The recorded vocabulary must be digitized and edited; this can be done by the school using the "U-Talk" User Recording option. Alternatively the school can send a tape of the recorded vocabulary to Periphonics for digitization and editing.

4.5 Automatic Referral of Transactions for Assistance

The system automatically detects when the user is unable to complete a transaction within a reasonable time period; the system can then use the referral feature option to transfer the call automatically to a staff member (who may be remotely located). Referral can also be initiated by a code sequence input by the user, or by decisions made by the application software as a result of the transaction in process.

Two types of referral options are available. When the system is connected to the telephone network via a PABX or ACD, "hookflash referral", (a software option that emulates manual transfer of a call on a PABX) is used. When the system is connected directly to the telephone network without a PABX or ACD, "dual line referral", (a software and equipment option) is used.

The system can be implemented with a time and date feature controlled by your Host computer to only allow referral when appropriate staff is available.

The referral feature can also be used to connect the caller to a tape recorder or voice mail system, to leave an address correction or other messages.

4.6 Hours of Operation

The voice response equipment provides the capability for 24-hour per day registration. Some schools chose to restrict the hours of operation to allow other tasks to have greater utilization of the mainframe computer.

4.7 Credit Card Payment

Many schools are now accepting payment via credit card. Some schools combine this with Touch-Tone telephone registration; others accomplish this via pre-authorization and batch submission of tapes. A discussion of the pros and cons of each approach is provided in Attachment B: "Fee Payment by Telephone" by Mark S. Elliott of GSU.

Periphonics can provide optional software and equipment for on-line credit card authorization via a telephone line to the bank or authorizer chosen by the school.

4.8 Pre-requisites and Co-requisites

During the "Teaching Registration to Talk" Conference at GSU on December 2 and 3, 1985, Dr. Robert W. Spencer, Dean of Admissions at Brigham Young University, strongly advised against any attempts to check for pre/co-requisites as part of the on-line computerized registration system. This recommendation applied whether or not Touch-Tone telephone registration was used, because of the tremendous load it would place on the computer. Dr. Spencer asked the audience (about 250 people from more than 90 schools) whether any of them checked pre-requisites on-line. Not even one school made such an on-line check in their present systems.

Periphonics recommends that the voice response dialogue ask the student to confirm that they have successfully completed specifically stated pre-requisites. During add/drops the system should ask for confirmation of co-requisites when appropriate.

4.9 Printed Instructions for Users

Simple instructions for using the system should be mailed to the student with the course schedule. Sample documents are shown in Attachments C and D.

SECTION 5: REASONS TO BUY FROM PERIPHONICS

- * Periphonics will share with you our 15 years of voice response experience, and our expertise concerning telephone/PABX interfaces and computer interfaces. Our Systems Engineers will help you evaluate and plan the project.
- * Our own nationwide Field Service Organization installs and services both the hardware and software in our systems.
- * Periphonics is committed to supporting our customers! We believe this commitment is particularly important in the educational marketplace.
- * System utility software to simplify system integration and future changes in voice response include: PARAM Application Manager, PAVE Vocabulary Editor, and the optional U-Talk User Recording.
- * Periphonics unique DataVoice option provides an easy means for enhancing the system to allow personal computer interaction over the same telephone lines and computer ports.
- * Periphonics has just announced a series of special configurations of voice response equipment optimized for student registration requirements. These configurations utilize our third generation of voice response equipment with LSI components and powerful software and development tools.
- * You can select the appropriate configuration because Periphonics offers the widest range of system size - from 6 telephone lines to 104 lines and modular growth is possible for both voice memory and telephone line interfaces.

- * Automatic Call Referral to the human operator, with or without a PABX, can be initiated by the caller, by the system, or by the application software.
- * Widest choice of host computer connection arrangements and/or protocols are available from Periphonics.
- * Field Proven reliability of our VoicePac and VoiceStar systems, which results from attention to detail in both design and manufacturing. The design makes extensive use of LSI chips, low-power components and error-correcting system memory, to enhance both performance and reliability. A thorough Quality Control procedure is performed on each system in our factory. The system is then retested by our staff at your site after we install the system.

APPENDIX A: SAMPLE DIALOGUE METROPOLITAN STATE COLLEGE
(INTERACTION SCENARIOS)

PRS | Telephone Registration System
7 |

Welcome to the Metropolitan State College Touch-Tone Information System. Please enter a service code.

7#

You have selected telephone registration for Spring semester. Please enter your student ID number.

123456789#

Please enter your personal access code.

Input 1234#

Possible Responses:

- 10: You are now registered for 12 credits.
(or)
You are not registered for any classes.
Please enter your request.
- 11: Your student ID number or your personal access code is not on our file. Please verify both numbers and call again.
- 12: You may not register until January fifth at eleven A.M. You may register any time after your assigned date and time, but not before.
- 13: Your registration has been encumbered by the business office. Please call 556-0123 for assistance. 556-0123. You may not register until you have contacted the appropriate office and they have cleared the hold placed on your record.
- 14: You have not been accepted for admission. Students must not only apply, but be accepted to the college prior to registering. Please call 556-1234 for assistance. 556-1234.
- 15: You are not eligible to register. Please call 556-2345 for assistance. 556-2345.

Thank you for calling.

ABC Add
2

Input A1234#

Possible Responses:

- 20: You have added call number 1234 ENG 101 3 credits.
You are third on the waiting list.
The location is off campus.
This class meets for 10 weeks.
You are now registered for 6 credits.
- 21: Call number 1234 is not on our file.
- 22: Call number 1234 ENG 101 3 credits is cancelled.
Call number 1432 is available and would fit your schedule.
Enter an A to add this class.
- 23: Call number 1234 ENG 101 3 credits is closed.
The number of students on the waiting list is 2.
Enter a W to place your name on the waiting list.
- 24: Call number 1234 ENG 101 3 credits is not available.
- 25: Call number 1234 ENG 101 3 credits would give you a credit
overload.
- 26: Call number 1234 ENG 101 3 credits has a time conflict with
call number 2345.
- 27: You are already registered (waiting) for call number 1234
ENG 101 3 credits.
- 28: You are already registered (waiting) for ENG 101.
- 29: The deadline to add call number 1234 has passed.

DEF Drop
3

Input D1234#

Possible Responses:

- 30: You have dropped call number 1234 ENG 101 3 credits.
You are now registered for 3 credits.
- 31: You are not registered for call number 1234.
- 32: You may not drop below 12 credits because you are receiving
financial aid.
- 33: The deadline to drop call number 1234 has passed.

GHI Help
4

Input H#

Possible Responses:

- 40: Please check the official class schedule for further
instructions.
- 41: Please check the official class schedule to determine the
correct four-digit call number for the class.
- 42: The class section you requested is no longer being offered.
Please check the official class schedule for other sections.
- 43: All the seats for this class have been filled. You may place
your name on the waiting list. Please check the official
class schedule for further instructions.
- 44: Enrollment and waiting lists for this class have been
terminated.
- 45: You may not register for more than 18 credits. Please check
the official class schedule for further instructions.
- 46: You may not register for classes which meet at the same time
or overlap. Please check the official class schedule for
further instructions.

47: You attempted to add a class for which you are currently enrolled.

48: You attempted to drop a class for which are not currently enrolled.

JKL	_____ List
5	

Input L#

Possible Responses:

50: You are now registered for the following classes:

Call number 1234 ENG 101 3 credits.
You are third on the waiting list.
The location is off campus.
This class meets for 5 weeks.

...

You are now registered for 10 credits.

Input L1234#

Possible Responses:

51: You are not registered for call number 1234.

52: You are registered (waiting) for call number 1234 ENG 101 3 credits. You are third on the waiting list.

This class meets from 9 A.M. until 9:50 A.M. on Monday, Wednesday, Friday starting January thirty-first for 10 weeks. The location is AR 183.

MNO	_____ Monetary Obligation
6	

Input M#

Possible Responses:

60: In-state tuition and fees for your classes total five hundred thirty-two dollars and fifty cents.

PRS Search
7

Input S1234#

Possible Responses:

70: The following sections of ENG 101 are available and would fit your schedule:

Call number 1236 3 credits.
The location is off campus.

. . .
Enter an S to continue the search.

71: No additional sections of ENG 101 are available and would fit your schedule.

TUV Terminate
8

Input T#

Possible Responses:

80: You are now registered for 12 credits. Tuition and fees for your classes total seven hundred eighty-eight dollars. Payment is due or arrangements made by January third, or your registration will be cancelled. Your address is not on our file. Please call 556-3456 for assistance. 556-3456.
Thank you for calling.

Other Responses:

- 01: Your request is not valid.
- 02: That function is not available at this time.
- 03: The computer system is not available at this time. Please call again.
- 04: The computer system has become inoperative. Please call again to verify your transactions.
- 05: A computer error has occurred. Please call 556-4567 for assistance. 556-4567.
- 06: Your request is being processed. Please hold on.

VOCABULARY MASTER FOR STUDENT REGISTRATION

Item

1	one	50	twentieth
2	two	51	thirtieth
3	three	52	fortieth
4	four	53	fiftieth
5	five	54	sixtieth
6	six	55	seventieth
7	seven	56	eightieth
8	eight	57	ninetieth
9	nine	58	hundredth
10	ten	59	thousandth
11	eleven	60	oh
12	twelve	61	A
13	thirteen	62	B
14	fourteen	63	C
15	fifteen	64	D
16	sixteen	65	E
17	seventeen	66	F
18	eighteen	67	G
19	nineteen	68	H
20	twenty	69	I
21	thirty	70	J
22	forty	71	K
23	fifty	72	L
24	sixty	73	M
25	seventy	74	N
26	eighty	75	O
27	ninety	76	P
28	hundred	77	Q
29	thousand	78	R
30	zero	79	S
31	first	80	T
32	second	81	U
33	third	82	V
34	fourth	83	W
35	fifth	84	X
36	sixth	85	Y
37	seventh	86	Z
38	eighth	87	Autumn
39	ninth	88	Winter
40	tenth	89	Spring
41	eleventh	90	Summer
42	twelfth	91	Monday
43	thirteenth	92	Tuesday
44	fourteenth	93	Wednesday
45	fifteenth	94	Thursday
46	sixteenth	95	Friday
47	seventeenth	96	Saturday
48	eighteenth	97	Sunday
49	nineteenth	98	A.M.
		99	P.M.
		100	no.

101 January
102 February
103 March
104 April
105 May
106 June
107 July
108 August
109 September
110 October
111 November
112 December
113 semester
114 quarter
115 module
116 dollars
117 cents
118 plus
119 minus
120 A computer error has occurred.
121 All the seats for this class have been filled.
122 Enrollment and waiting lists for this class have been
terminated.
123 Enter a W to
124 Enter an A to add this class.
125 Enter an S to continue the search
126 No additional sections of
127 Payment is due or arrangements made by
128 Please call
129 Please call again to verify your transactions.
130 Please check the official class schedule
131 Please enter
132 Remember to press the pound key after each request.
133 Students must not only apply
134 Thank you for calling.
135 That function
136 That service
137 The class section you requested is no longer being
offered.
138 The computer system
139 The computer system has become inoperative.
140 The deadline to
141 The following sections of
142 The location is
143 The number of students
144 This class meets
145 Verify both numbers
146 Welcome to the best possible college for tax collectors
(up to 8-second custom message)
147 You are

148 You are already
149 You are not
150 You are now
151 You attempted to
152 You have
153 You have not
154 You have selected
155 You may
156 You may not
157 Your address
158 Your registration has been encumbered by
159 Your request is being processed. Please hold on
160 a class for which
161 a service code.
162 add
163 added
164 after
165 again
166 and
167 and they have cleared the hold placed on your record.
168 and would fit your schedule.
169 any classes.
170 any time after your assigned date and time, but not
before.
171 are
172 are not
173 at
174 at this time.
175 available
176 because you are receiving financial aid.
177 been accepted for admission.
178 before
179 call number
180 credit
181 credits
182 currently enrolled.
183 drop
184 drop below
185 dropped
186 eligible to register.
187 ending
188 for
189 for assistance.
190 for classes which meet at the same time or overlap.
191 for further instructions.
192 for more than
193 for other sections.
194 from
195 grade

196 has a time conflict with
197 has passed.
198 in-state
199 is
200 is cancelled.
201 is closed.
202 is incorrect
203 is not
204 is not on our file.
205 is not valid.
206 method of payment code
207 off campus.
208 on
209 or
210 or your registration will be cancelled.
211 out-of-state
212 received the following grades for
213 register
214 registered for
215 starting
216 telephone registration
217 the following classes.
218 the semester code
219 on the waiting list
220 to determine the correct four-digit call number
221 tuition and fees for your classes total
222 until
223 until you have contacted the appropriate office
224 waiting for
225 weeks.
226 would give you a credit overload.
227 your
228 your Student ID number
229 your personal access code
230 your request
231 the admissions office
232 the advising center
233 the business office
234 the financial aid office
235 place your name
236 to be arranged.
237 but be accepted to the college prior to registering.
238 for the class.
239 Touch-Tone information system.

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APPENDIX B: FEE PAYMENT BY TELEPHONE

Mark S. Elliott, Georgia State University

Registration and fee payment are at many institutions the source of strained relationships between registrars and bursars. Oftentimes, the objectives of registration come into conflict with the objectives of fee collection for what is good for registration is not always good for fee payment. Making it easier for students to register typically makes the fee collection task more challenging. Such has been the case at GSU, where fee calculation and payment confirmation had been imbedded in the on-line registration system since 1975.

HOW WE DID IT FOR YEARS

In GSU's walk-in, opscan-input based system, the procedure for fee payment used to work like this:

Students registered in a central area by appointment. Each registration transaction generated either a three-part schedule invoice form or a one-part problem schedule form. The forms, generated on local printers, were given to the students immediately as feedback of the success or failure of their registration input. While in the area, students could submit repeated schedule requests (opscan forms) until the invoice contained the desired list of courses.

Presumably with a good invoice in hand, the student left the area and delivered the three-part invoice along with payment to Student Accounts before the fee deadline. At GSU, where payment is required in advance of class attendance the fee deadline has traditionally been 7:00 PM on the last day of each registration phase. The cashiering process in Student Accounts returned one stamped "PAID" copy of the invoice to the student and retained two copies: one for fee confirmation and ultimate delivery to the Registrar's quarterly alphabetical file, and one for retention in a quarterly alphabetical file in Student Accounts.

The three part invoice was itself an opscanable document and the invoice printing process slugged the form with student ID number and transaction sequence number. This data, relayed from an opscan device in Student Accounts, could inform Registration that student #1234565789 had paid Schedule #3. So long as the student always paid under the latest schedule, it was known that the correct money had been collected. If a schedule number other than the last on file (in the Registration System) was confirmed, the student was electronically flagged as a potential payment problem and scrutinized manually.

For over ten years this form of payment control has worked successfully. But in 1985, with the advent of Touch-Tone, new wrinkles were introduced which made the old process unworkable. No longer was the student's physical presence at Student Accounts (to pay fees) legitimized by his presence on campus for registration. No longer was a three part document immediately in the hands of the student at the conclusion of his registration transaction. And if no document was in the student's hands, what would the student use for a remittance document? With registration phases ranging from two to eight days and students registering by telephone within hours of the fee deadline, there was insufficient time to mail an invoice. With no invoice how would Student Accounts verify that the student was indeed paying the correct amount of money? These were tough questions because not only did they require technical solutions, they required acceptance and compromise across two divisions of the administrations.

FEE PAYMENT SOLUTIONS AIDED BY TELEPHONE

Fee payment by bank debit and/or credit card is certainly not new to college registration. Many institutions have allowed this form of payment as apart of walk-in and batch registrations for years. At Georgia State fee payment by credit card had been explored over ten years ago and rejected because of conflicts between state policy which prohibited discounted fees and state banking laws which prevented non-banking institutions from attaching credit surcharges. Automated bank debits had never been considered because the current options of cash and check were well understood by students and administrators and thought by the later to be adequate for the needs of the former.

In 1985, Touch-Tone registration became the catalyst toward more convenient forms of fee payment. Having completed the first test in March, we began to realize that fee payment was the largest single obstacle preventing the telephone system's complete acceptance. Many students surveyed after the first and second tests rightly questioned the convenience of Touch-Tone if they still had to come on campus to pick up an invoice or to pay fees. In early March we met with local banking representatives to explore "paperless" forms of fee payment which could be initiated as a part of the student's Touch-Tone call.

Early discussions ranged from point-of-sale electronic debits to credit card payments to pre-authorized debits. Following is a synopsis of each:

<u>Mode of Payment</u>	<u>Description</u>	<u>Pros and Cons</u>
On-line credit card payment	<p>This approach also relies on a communication link with an external network - a credit card approval service. This is a service bureau to which many banks subscribe, through which all VISA/Mastercard transactions are channelled. The link would be similar to the debit link in that credit card transactions would be approved/disapproved on the spot.</p>	<p>Pros:</p> <ol style="list-style-type: none"> 1. Student completes credit card payment over the telephone. 2. Credit card approvals made automatically without tying up student accounts personnel on the telephone. Gets us into credit payment option without adding a manual approval bottleneck at Student Accounts. <p>Cons:</p> <ol style="list-style-type: none"> 1. Data entry burden for caller. 2. Costly communications link to a separate network than that used for automatic debit. 3. Increased telephone call duration. 4. Must deal with network downtime.
Pre-authorized debit	<p>This approach is not as technically sophisticated as the other two. This process is the debit equivalent of automatic direct deposit. Students wishing to avail themselves of the service must preauthorize the school and the bank, in writing to debit their account</p>	<p>Pros:</p> <ol style="list-style-type: none"> 1. Data entry and validation is shifted to the pre-authorization period. No data entry burden added to Touch-Tone call. 2. Of the three, has least impact on duration of call. 3. No expensive and sophisticated communications network required. No attendant concerns about downtime. 4. Deposit (i.e., delivery of tape to bank) can be delayed creating an incentive (i.e., float on student's money) over conventional payment methods.

Mode of
Payment

Description

Pros and Cons

on a periodic basis for an unspecified amount. The written authorization must be received at least 15 days in advance of the first transaction, is retained by the school so long as it remains in effect, and is available for inspection by banking authorities, if requested. Actual debits are submitted to the bank on magnetic tape as the charges are incurred.

5. Any "returned checks" can be handled through pre-existing returned check mechanisms (i.e., registration hold and collection process)
6. 97% of Georgia banks and a high percentage of all U.S. banks are member of the Automated Clearing House (ACH), a division of the Federal Reserve, which administers this EFT network.

Cons:

1. Slight increase in telephone call duration.
2. More follow-up (i.e., production of tape and delivery to the bank) after the registration than in previous two methods. Must still balance bank's deposit ticket against tape detail, but the batch environment which produces the tape and supporting detail is more stable and controllable than for on-line links.
3. At least one-day delay in getting deposit in the bank compared to previous alternatives.

Mode of
Payment

Description

Pros and Cons

Point-of-
sale
electronic

This approach relies on a Georgia-wide debit automated-teller (ATM) network, called AVAIL, and our ability to maintain an on-line link with it (i.e., a link between our registration system and their banking network software). We proposed that each transaction be passed to the network as it occurred, that it be acted upon immediately (i.e., validated, approved, and booked), and that feedback as to the success or failure of the transaction would be returned in real time to our system (and in turn to the caller still on the line).

Pros:

1. Student can complete payment by telephone.
2. Immediate feedback to student as to success or failure of payment transaction.
3. No bad checks since approval is part of the process.
4. No administrative follow up to receive funds other than balancing a network generated deposit ticket to internally generated transaction summary.

Cons:

1. Data entry burden for caller since he must enter a ten digit bank routine transit number plus a four digit PIN. Much potential for error necessitating retransmission.
2. Security question since nonbanking system software has access to PIN.
3. Relies on a costly communications link.
4. Increases length of telephone call due to prompting, extensive data entry, and network processing time.
5. Registration software must allow for downtime on banking network by providing some alternative to callers during this period.
6. Limited group of Georgia banks participating in AVAIL. No banks outside of Georgia tied to AVAIL network.
7. Questionable whether ATM network will support point of sale in next 18 months.

Our preference at first was to go with the more futuristic and technologically sophisticated approaches. The more we explored with the bank the on-line automatic debit, however, the less appeal it had. We had serious questions about security and our own liability in a system where we had access (through our software) to the Personal Identification Number (PIN) of each participating caller. We also had serious concern with maintaining consistency between the two (ours vs. the network) in the face of potential system and communications failures -- not that these concerns could not be addressed, but at what cost?

The pre-authorized debit which at first seemed least promising eventually proved to be the most practical and the easiest to implement. On a test basis in September and on a production basis in November 1985, students were allowed to preauthorize and subsequently charge fees by this new method. Preliminary use of pre-authorized debit has been sparse at best, but very little publicity occurred prior to the preauthorization deadline for November registration. Based on a student survey (February 1985), it is anticipated that almost fifty percent of GSU students who pay by check will soon take advantage of the pre-authorized debit. Many more, it is expected, will take advantage of the credit card option which is scheduled for Spring testing and summer implementation. For now at GSU, the on-line debit has been abandoned as a costly, unfeasible alternative to the pre-authorized debit. As for the pre-authorized debit, students will be attracted not only to its convenience, but to GSU's planned practice of delivering the debit tape to the bank after the fee deadline, thus guaranteeing them the same float they would get by tendering their checks on the fee deadline date -- all the benefits of paying by check on the last day without the hassle of getting off work, driving downtown, and standing in line.



Telephone Registration Instructions • Metropolitan State College

The following easy-to-follow instructions will enable you to register (add and drop classes) by telephone. Please read them carefully before you call the system number, 86-METRO, to begin the process.

I. Call the System Number. - You do this by entering 866-3879 (86-METRO) on your touch tone telephones.

II. Select the Service Code. - Once you have entered the System Number, you will be asked for the Service Code. Enter **[7]** "N" for registration on your telephones, then the **[#]** key, and wait for a response.

III. Enter Your Student Identification Number. - This is your social security number unless you have been assigned a special number. After you've entered your number, enter the **[#]** key and wait for a response.

IV. Enter Your Personal Access Code. - Your Personal Access Code consists of your birth month, stated in 2 digits, and your birth day, also stated in 2 digits. For example, if you were born on February 8, you would enter **[2]** for February immediately followed by the numbers **[8]** **[#]** **[#]**. Enter your Personal Access Code, followed by the **[#]** key, and wait for a response.

V. Dropping a Class. - To drop a class, enter the drop code **[7]**, then the 4-digit call number of the class, followed by the **[#]** key, and wait for a response. Repeat this procedure for each class to be dropped. Drop classes before adding to avoid possible conflicts or credit overloads.

VI. Adding a Class. - To add a class, enter the add code **[7]**, then the 4-digit call number of the class, followed by the **[#]** key, and wait for a response. Repeat this sequence for each class added. Time conflicts and class overloads cannot be processed by telephones. These must be added during walk-in registration.

VII. Terminating Your Registration Conversation. - To complete your add, drop, search, or inquiry of your registration, enter the terminal code **[7]**, followed by the **[#]** key, and wait for a response. If you inadvertently hang up or are cut off, please call back immediately to verify your registration transaction.

VIII. Wait List. - To place yourself on the wait list for a closed class, enter the wait code **[7]**, then the call number, followed by the **[#]** key, and wait for a response. Be sure to record your wait list position on your worksheet.

IX. Search For an Open Section. - To search for an open section of a class that is closed or cancelled, enter the search code **[7]**, the call number of the class that is closed or cancelled, followed by the **[#]** key, and wait for a response. The system will list open sections of the same course which fit into your existing schedule.

X. Listing of Classes. - At any time, you may obtain a list of the class(es) for which you are registered. To obtain a listing of all the classes for which you are registered, enter the list code **[7]**, followed by the **[#]** key, and wait for a response. To determine whether you're registered for a specific class and also to receive more information about the class, enter the list code **[7]**, the 4-digit call number of the class, followed by the **[#]** key, and wait for a response.

XI. Determining Tuition and Fees. - To determine the amount of tuition and fees (money) you owe, enter the Monetary obligation code **[7]**, followed by the **[#]** key, and wait for a response.

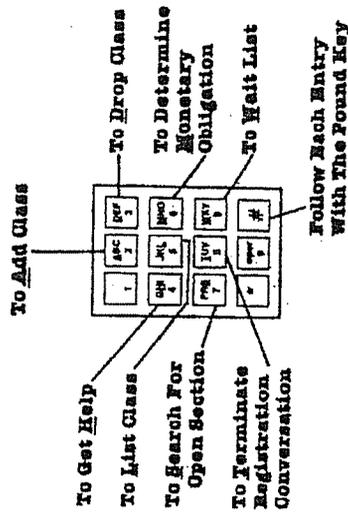
XII. Getting Help. - Due to the nature of this system and the usage of certain phrases or words, you may need to obtain another explanation of what the voice response has told you. In order to get help in these circumstances, enter the help code **[7]**, followed by the **[#]** key, and wait for a response.

XIII. Repeat Previous Message. - Should you desire to hear the last message spoken to you, enter **[*]** **[*]** (the star key twice in succession) and wait for a response.

XIV. Cancel Input. - If you have entered a transaction but have not entered the **[#]** key and realize you have made an error or you have changed your mind, enter the **[*]** key, then the **[#]** key.

For assistance, call the office of Admissions and Records at 866-3879.
(Produced through the MEC Office of Publications)

Telephone Registration Hours
 Dates: December 16-19
 Time: 8:00 AM - 5:00 PM



For assistance, call the office of admission and records at 886-8887.

Metropolitan State College
 Denver, Colorado

Metropolitan State College Telephone Registration Worksheet

(Fill Out This Form Before You Call The System Number)

I. Call the system number: 556-3876 (55-METRO)

II. Enter the service code "R" for registration, then the key.

III. Enter your student identification number: 089123001, then the key.

IV. Enter your personal access code: 02 14, then the key.
Birth Month Birth Day
(2 digits) (2 digits)

Enter your request (code call number, key):

V. Drop
Code Class
 Call Number
 4021

VI. Add
Code Class
 Call Number
 4795
 5675
 5755
 6618

Dept	Course Number	Credits	Class Day	Class Time	Wait List Position
ACC	201		MTWTF	9:00-9:50	
ECC	202	3	TR	11-12:15	
TR	322	3	MWF	10-10:50	2
MKT	300	3	TR	9:30-10:45	
SPA	101	5	MWF	11-12:25	

VII. Enter to terminate this registration conversation

Total Credits <u>14</u>	Total Tuition/Fees \$ <u>524.00</u>	Tuition/Fees Payment Deadline <u>January 3</u>
-------------------------	-------------------------------------	--

Other Options

- VIII. Enter To place yourself on a wait list
- IX. Enter To search for an open section
- X. Enter To list your class or classes
- XI. Enter To determine your tuition and fees (monetary obligation)

- XII. Enter To get help
- XIII. Enter To repeat previous message
- XIV. Enter To cancel input prior to pressing the key.