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CPRC

CANADIAN POLICE RESEARCH CENTRE



CCRP

CENTRE CANADIEN DE RECHERCHES POLICIERES

TM-07-91 ***Canon Group 4 Fax***

By Sgt. G. Madrick

TECHNICAL MEMORANDUM

Submitted by
Metropolitan Toronto Police Force

December 1991

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EXECUTIVE SUMMARY

This research project came about as a result of a meeting between Canon and Metropolitan Toronto Police Force and the Royal Canadian Mounted Police. During a demonstration of various colour copiers, an L6500 Group 4 Digital Fax machine was selected.

Sales representatives took a very active role in discussing the mechanics of installing equipment in each location. Metropolitan Toronto Police Force (MTPF) and the Royal Canadian Mounted Police (RCMP), agreed to a one month evaluation period.

Installation of the Canon L6500 and the Centrex data lines took place in early June but was not up and running properly until June 1 Oth, 1991. The termination date was extended to give the project a full one month time period.

The main concerns of both Forces were:

- (a) the aging Muirhead faxing system
- (b) acquiring a fax machine capable of producing a 1: 1 faxed copy and a high resolution photocopy of fingerprints and photographs.

Other concerns centred around the faxing of latent crime scene prints and C216 fingerprint forms for searching on the AFIS system.

This report contains 13 tests that were conducted by the MTPF with the cooperation of the RCMP. Also included is a report from the RCMP outlining their tests and findings.

The faxing of C216 fingerprint forms, various photographs and a combination of documents with text and photos was extremely successful. The faxed copies of the fingerprints when compared to the originals were of equal quality with very little degradation of detail. Photographs faxed in the photo and high resolution mode were of a good quality, far surpassing any sent by Group 3 fax (normal fax). Documents with a combination of text and photos after some experimenting with densities and modes proved to be very successful with good resulting faxed copies.

Tests concerning the faxing of latent crime scene prints was not too successful. If the latents were extremely good then the resulting fax was acceptable to the RCMP for AFIS searching. There was considerable loss of detail in most faxes.

Other areas tested were faxing of footwear impressions, Certificates of Conviction and documents for handwriting analysis. The document and footwear testing proved to have limited success. Reports received about the documents indicated that the Fraud Section could analyze the handwriting but the paper was not sturdy enough to take the handling. We consider the present system of supplying a copy of the negative to the RCMP a more efficient method of handling the large number of submissions. Testing on footwear impressions was considered by both parties to be an adequate investigational tool.

The Certificates of Conviction were faxed to MTPF-FIS as a result of our requests. The resulting faxed copies were equal to the quality of the original certificates. The normal procedure for ordering a certificate from the RCMP takes about 2 weeks for delivery by courier. Using the L6500, the time was cut down to one or two days. Acceptability by the courts has not been tested and will be addressed in consultation with the Force's legal advisor.

The Canon L6500 Digital Fax costs approximately \$24,000.00 but can be leased over a 36 or 60 month term. Terms are negotiable.

It is Forensic Identification Section's (F.I.S.) recommendation that the Metropolitan Toronto Police Force purchase or lease a Canon L6500 as soon as possible.

L6500

CANON

GROUP

4

DIGITAL

FAX

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TEST # 1

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To fax fingerprints of deceased persons, potential recidivists and request fingerprints for visual comparison, to determine the quality of the faxed prints for identification purposes.

METHOD: During the test period numerous sets of fingerprints were faxed to Ottawa, RCMP, asking them to search them against their data base. The RCMP were also asked to fax to the MTPF-FIS fingerprints that we needed for comparison against our latents or C216 ten-print forms.

RATIONALE: During the course of our investigations, we are called upon to identify dead bodies, identify potential recidivists(liars) and to compare latents against known prints.

1) Dead bodies are normally fingerprinted and a full set of prints are submitted to Ottawa by surface mail. This can take up to one week to accomplish but if there is a rush for identification, the prints can be faxed over the RCMP's Muirhead system. This procedure ties up a man for a minimum of one-half hour to take the prints to the Toronto RCMP depot, wait 15 minutes for the fax to be completed (longer if several attempts have to be made)and then return prints to Headquarters.

2) Over the test period numerous requests were received to check on prisoners who were suspected of lying or who refused to identify themselves. The normal procedure would be to fax the prints as above. Time consuming.

3) In cases where we have numerous jobs to search against a suspect, not known to us, we would normally request a set of fingerprints be faxed to us by Muirhead or a photocopy sent by surface mail (in some cases by

courier). This involves a time lag and the expense of postage or courier fees.

During the test period we faxed 'a set of fingerprints for Niagara Regional PF for an AFIS search on a prisoner who had been arrested for Robbery.

RESULTS: Faxing of the fingerprints took an average of 30 seconds to transmit to Ottawa. The resulting copies received by Ottawa were purported to be of an excellent quality and suitable for searching on AFIS. Comparison prints sent to us by Ottawa for comparison to our latents were also of excellent quality.

The faxing of the fingerprints for Niagara Regional took about 3 minutes 32 seconds (4 pages of varying densities). The time of transmission was 13:34 and we received an answer back at 15:21.

CONCLUSION: It was our observation that it was much faster and cheaper to fax prints back and forth between Toronto and Ottawa than it was to send by mail or fax by Muirhead. Priority mail or courier system rates range around the \$5 to \$7. With the L6500, the prints can be sent immediately and an answer back in several minutes or several hours depending upon the request.

The normal toll charges during peak hours to Ottawa is about .38 cents per one minute increment. Cost for the sending of one C216 form (30 seconds) is about .19 cents. The cost to send the Niagara Regional prints(3'32") was about \$1.35.

The Muirhead fax copies show a definite loss of detail and it can be very time consuming(2 or 3 attempts) in getting an acceptable copy to the RCMP Ottawa.

Taking all the facts presented into consideration it can be readily seen that using the L6500 Group 4 Fax is a more efficient way to transmit fingerprints. It will reduce the amount of man hours previously used to send by Muirhead, cost less to handle and produce excellent quality copy.

TEST # 2

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: RCMP to fax a set of C216s of known FPS files that were on the MTPF-FIS AFIS data base. This was accompanied by the Metro Toronto Force sending to Ottawa a series of 10 C216s each day for search on their database. The test was to determine if the faxed prints had sufficient detail for an AFIS search, identification and were 1:1 in size.

METHOD: Ten print forms, C216s, were pulled from the Master files of each Force that were known to be on the AFIS data base of each Force. Once received, they were entered into the AFIS system for search purposes. and the resulting respondent scores recorded.

The 10 print forms were faxed in the character and high resolution mode after establishing the best densities.

RATIONALE: Each day there is sufficient demand to have fingerprints verified by comparison to original prints. Many times there are no prints in our file for the suspect or arrested person. All fingerprints of persons printed for an indictable offence are stored in the National repository of the RCMP at Ottawa.

For several decades the RCMP have maintained a Muirhead faxing system, with one such machine located in "0" Div. Toronto.' Because of the age of the system, high maintenance cost, extremely slow speed and the fact that there is a loss of detail in the final copy, the Group 4 fax presented an excellent alternative.

RESULTS: The C216s were faxed to MTP-FIS and entered into The AFIS system for search. 20 ten print forms were used during the tests and all hit on the system except one. The one exception resulted from the form not being in the database.

The test resulted in the following scores:

Search#	MTP Match#	Score
500...2	14344/90	5762
500...5	15864/90	3485
500...3	6155/90	9308
500...4	8084189	3250
500...1	8264/89	1255
500...6	207/89	2407
500...7	15548/88	6733
500...8	8105/89	6335
500...10	1510/86	12096
500...9	13402/87	5084
500...11	6523/85	12060
500...12	no hit	
500...13	15516/90	2695
500...14	7133/85	9459
500...15	1015/85	10724
500...16	8235/78	6562
500...17	8270/89	4293
500...18	8580/87	10026
500...19	9431/79	2429
500...20	4946/87	4214

The faxed copies were compared against the original MTP Masters and were found to of the same quality.

CONCLUSION:

The test was successful in that it provided proof that the L6500 Group 4 fax is a viable replacement for the Muirhead fax system and produces a much better end product.

On the average it takes about 30 seconds to fax one C216 between the two terminals. It should be noted that the first copy of the G4 fax was good each time. The Muirhead takes about 15 minutes per copy and usually takes more than one transmission to get a good copy. Group 3 fax produces an unreadable set of prints while Photophone can only transmit one digit at a time and is much slower than the L6500.

There is a definite need for the Metropolitan Toronto Police Force, Forensic Identification Services, to acquire the Canon L6500 for transmission of the C216 fingerprint form. It becomes a very important issue knowing that there is a very high probability that the RCMP will be moving from the -Toronto area and will not be available for any transmission of data to Ottawa.

The AFIS system is not set up for the transmission of the C216 ten print form. It is geared for the transmission of a single latent fingerprint from a crime scene. It also becomes a matter of time and whether our Window into the RCMP AFIS system is available.

TEST # 3

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To fax a series of latent fingerprints that have been previously identified to a known file. This test was made to evaluate the feasibility of faxing latents directly to the RCMP and bypass the normal photographic development.

METHOD: Sent to Ottawa were 1) fax of original silver lift
2) fax of copy of silver lift
3) fax photograph of lift
4) fax original black lift

The faxed copies were sent to Ottawa in varying densities and in the high resolution setting.

RATIONALE: The majority of latent fingerprint lifts are either silver or black powder. The normal process for submission to the RCMP is by the conventional photographic method and producing a hard copy 1:1 photograph.

These photographic prints are of a high quality with very good definition. If the L6500 could produce the same result, it would save man hours and reduce the cost of submissions for searching on the National AFIS system.

RESULTS: The images were copied into the L6500 in varying densities and a photocopy produced before faxing to Ottawa. The photocopies exhibited a higher degree of definition than did the faxed copies returned to us.

There was a great loss of detail in the final faxed copy received by the RCMP of a straight silver lift. Some improvement in faxed the copy of the silver lift and not much more detail in the faxed copy of the photograph.

It would also appear that there was some loss of detail when the original lift was photographed and made up into a hardcopy. More detail can be seen in the faxed photocopy.

Time expended to fax 12 pages of silver lifts -
1' 48"

The original black latent lifts were of good quality with one being slightly darker than the other. Both were transmitted together which resulted in having to send several faxed copies so that a good copy could be obtained. A good print in one resulted in the other print being very poor.

There was sufficient definition in the black lifts for it to be searched on the AFIS system and kept in the unsolved latent file.

CONCLUSION:

The L6500 has the capability to copy latent lifts that are of some value. Because there is a great loss in both the photocopy and the faxed version it is not recommended as a normal everyday procedure. Emergency use only.

It should be noted that taking a photocopy of the lift and then faxing it resulted in better definition than a straight fax of the original lift.

TEST # 4

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To evaluate the quality of faxed 1:1 polaroid photos of black powdered lifts.

METHOD: 6 copies of latent black powdered latents were produced using a polaroid camera using the 1:1 attachment. These photographic hardcopies were then faxed to Ottawa in various densities using the character and high resolution mode.

These latents and 1:1 photos were produced by York Regional Police Force and used in our testing.

RESULTS: Of the original 1:1 photographs produced, only three of the six were of good quality.

The RCMP were able to load 2 of the total number faxed into the AFIS system. In their reply to US re the transmissions it was mentioned that the remainder were of insufficient detail to search.

In checking the original photographs only 2 and maybe 3 were of any value for searching.

CONCLUSION: Same findings as in Test #3 (silver and black lifts) Machine capable of copying or faxing good prints but where there is any loss of detail in the original prints there is a greater loss when faxed. Some of the loss can be picked up by faxing a copy of the latent but is still not up to the quality produced by the conventional photographic process.

Good for an emergency and then followed up by the proper submission of 1:1 photographic hardcopies.

TEST #5

CANON L6500 GROUP 5 DIGITAL FAX

OBJECTIVE:

To fax a series of documents to Ottawa RCMP for the following purposes;

- a) documents for hand writing analysis
- b) documents for fingerprint analysis.

METHOD:

A series of cheques were faxed to the Fraud Cheque Section of the RCMP via the Group 4 fax. They were to be examined by S/Sgt Lehmann, NCO i/c of the Fraud Cheque Section, as to their quality and viability for handwriting analysis. Densities were determined by Metro after analyzing photocopies using various settings and then saving to memory for transmission.

A series of ninhydrin treated cheques were faxed to the Latent Examination section of the RCMP for their evaluation of the fingerprints that had been developed.

RATIONALE:

This test was used to check on the feasibility of sending documents by Group 4 Fax to the RCMP for handwriting analysis. At the present time all documents are photographed upon arrival at FIS, chemically treated and rephotographed if fingerprints are developed. For handwriting analysis, the negatives are sent to the RCMP and they make up the hard copy photos.

The test was to see if the photographic process could be eliminated for both handwriting and fingerprint submission while still retaining high quality.

RESULTS:

TEST A)

Several specimen cheques were faxed to Ottawa for expert examination by S/Sgt Lehmann. The resulting copies received by Ottawa were generally good but needed enhancement in *some* areas. In a faxed memo, S/Sgt Lehmann pointed out 4 considerations that we should make if we were to decide to use the fax and not our present method. The memo forms part of this test report.

TEST B)

For this test we used a recent case where over 1000 documents were involved in a large fraud and reoccurring latent prints were faxed to Ottawa for entry into the AFIS system

The RCMP were quite satisfied with the resulting faxed images and proceeded to search them on AFIS.

Time for the transmission of the above test B fingerprints was 6' 43" (3 full 8 1/2" x 14" pages)

CONCLUSIONS:

According to the Fraud Cheque Section technicians, the faxes received were clear and of a quality sufficient enough to enable an analysis. The one main fault with the fax process was the durability of the fax paper, needs to be stronger to sustain the handling.

In our analysis, we agree that the present photographic system satisfies both parties in that it gives good quality reproductions for analysis. It also presents less work at our end at a lesser cost.

The faxing of documents and/or fingerprints on documents is viable only when an emergency exists.

TEST # 6

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To evaluate the quality of the digital copy capabilities of the L6500 when copying a hard copy photograph.

METHOD: In this test we were fortunate enough to use the L6500 twice to produce quality copies for media release. In both cases the subject of the photo suffered from Alzheimer disease. In one case a passport photo was available and the other case a home photograph was used. They were placed on the L6500 and enlarged to a 5" x 7" format suitable -for a press release. Numerous copies were reproduced for release.

RATIONALE: Forensic Identification Services are responsible for making available to the media photographic reproductions that are suitable for television or press. In most cases these requests are made after the Photo section has closed for the day and no one is available.

The normal photographic process involves rephotographing the original photo, processing the negative and then making up the enlargements. This process can tie up one technician or officer for one to two hours. In most cases they want them ASAP.

RESULTS: The total process, using the L6500, took about 10 minutes to produce enough copies for the media and 100 copies for distribution to the Divisional scout cars. The quality of the copies were very good and acceptable to the media.

The 10 minutes included the time used to test the various densities to get the right tone. This involved about 2-3 test sheets.

CONCLUSIONS:

The L6500 Group 4 fax machine because it is digital reproduces a photocopy of superb quality. The various settings that allow for character, character/photo and photo, plus the settings for three levels of resolution make this machine one of the best photocopy machines on the market.

Canon's advanced laser beam printing process lets you reduce and enlarge images from 35% all the way up to 800%.

The digital G4 technology, laser beam printing allows for halftones in 64 different shades of grey, making the reproduction of photos on plain paper very close to the originals. Once the proper settings are established the L6500 can print at 30 sheets per minute.

The cost of materials using the Group 4 is as follows: (1 - 5x7 per sheet)

Paper	-	.01
Toner	-	.0155
Service	-	.03

MATERIAL TOTAL @ .0555 per page x 125 = \$6.875

Also ten minutes of labour - \$3.045
GRAND TOTAL = \$9.92 (125 copies)

Cost using the conventional photographic method is as follows:

Negative	-	\$1.00
Paper	-	\$12.50 (125 COPIES)

MATERIAL TOTAL \$13.50

Using minimum of 1 hr labour- \$18.00
GRAND TOTAL = \$31.50 (125 copies)

The total time of one hour (conservative) for the conventional method is only good if there are no problems and the first negative is bang on the exposure. Using the L6500 it is a matter of only seconds to adjust density.

There is a definite savings in material and manhours. Most of the after hours requests are for photos of missing children. The quality of the L6500 in photocopying another photographic is such that it allow you to photocopy a photocopy and not lose detail.

Using this method 6 photocopies (mugshot size) could be placed on the L6500 and photocopied onto a 8 1/2" x 14" and numerous sheets run off at a greater savings.

TEST # 7

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To fax Certificates of Conviction pursuant to the provisions of Section 67 of the Criminal Code, upon request by MTPF-FIS.

METHOD: When a request was received by MTPF, the RCMP in Ottawa would be notified of the pertinent information and asked to send it by Fax.

RESULTS: A request was sent to RCMP Ottawa for Certificates of Conviction on FPS #s **925879B** and **322056B**. The certificates were prepared by Cpl. Andy Skinkle, Records Analysis Section, Criminal History Branch. They were faxed to MTPF-FIS and compared to a Certificate that had been sent by courier using the normal procedures for the issuance of a Certificate.

The faxed copies were excellent quality with crisp, clear ridge definition and good contrast. Excellent blacks and whites. When compared to the usual Certificate - one original and one copy, there were no noticeable differences.

The only thing that is in question is that the faxed certificates do not have an original signature by Cpl. Skinkle. This matter is being presented to our Force's legal advisor for an opinion.

CONCLUSION: This is an excellent vehicle for the transmission of Certificates of Conviction. The quality is not a question as it is equal to the quality of the normal certificates.

The present system of requesting Certificates of Conviction should be used while we are getting a ruling or a test case in court.

A system of Criminal Identification and production of Certificates using the Canon Group 4 fax is being presently used in New York State. Albany, New York, is the central repository for New York state and they are using this system guarantying a 4 hour turnaround time. There are about 75 units through out the State. Faxed Certificates are being accepted in the courts of New York State. It is also being sanctioned as a means of transmitting fingerprints by the FBI.

See Appendix "E"

TEST # 8

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE:

To fax photographs, Police Bulletins and newspaper clippings to RCMP Ottawa via the L6500 and then to compare the originals and photocopies taken at the time of transmission.

METHOD:

Photographs: Three sets of photographs were chosen to represent a cross section of the various mugshots that are produced. Set 1 consisted of two black and white photographs with one being darker than the other. Set 2 contained two colour photos with one light skinned and one dark skinned subject. Set 3 was made up of one colour and one black and white photo.

The settings were the same for each set of photos -

- 1) Auto - Photo mode - **High' Resolution**
- 2) 2.5 - ' ||
- 3) 1 - ' ,t
- 4) 7.5 - IV , +
- 5) 9 - II ||
- 6) 5 - 1, ||

Bulletins: A Metropolitan Toronto Police most wanted bulletin was used as the original. It is made up of halftone photos and black type.

Settings:

- 1) Photo - Auto - High Res
- 2) Character - Auto - ||
- 3) Char/Photo - Auto - ||
- 4) Photo - Auto - High Res - Hi Contrast
- 5) Char/Photo - Auto - Hi Res - Hi **Cont**

Newspaper Clippings(Black/white): A newspaper clipping was used that combined news print and several photographs in the black/white format.

Settings:

- 1) Character - Hi Res - Auto
- 2) Char - Hi Res - Auto - Hi Cont
- 3) Char/photo - Hi Res - Auto - Hi Cont
- 4) Char/photo - Hi Res - Auto
- 5) Photo - Hi Res - Auto

Newspaper Clippings(Colour): A newspaper clipping was used that combined both a colour photograph and black white print.

Settings:

- 1) Photo - Hi Res - Auto
- 2) Character/Photo - Hi Res - Auto
- 3) - Hi Cont
- 4) Character - Hi Res - Auto

RATIONALE:

The purpose of the test was to determine the quality of the fax when compared to the original and photocopy generated by the L6500 prior to any faxing of data. To determine the viability of the L6500 as a tool for the sending of Police information over telephone lines. This information can be of many forms and the common forms were used in this test.

RESULTS:

Photographs: Black/white

The photocopies were all readable but only three were in the good category. These were all on the manual settings of 2.5, 1 and 5. The faxed copies were much better than the photocopies. All were of acceptable quality.

Excellent quality when compared to Group 3 faxed **photos.**

Colour

The photocopies were good quality reproductions and the faxed copies displayed some degradation in all samples.

Black/White & Colour

The photocopies were all acceptable except the first scanned photograph where by error the setting was on character and not photo mode. Both photocopy and faxed version suffered a big loss of detail and were **extremely high contrast**.

All remaining faxed copies were good and visually appeared to have more detail than the photocopies.

Bulletins: A great variance in the quality of the photocopies depending on the mode setting. The photo setting tended to give an overall greying of the whole page but could be corrected by using the addition of the High contrast mode. This addition cleaned up the overall greying but detail was lost in the photographs. All copies were acceptable except those (2) copied in the photo mode. They tended to look washed out when auto mode used.

The faxed copies returned by the RCMP also displayed the overall greying when in the photo mode. Polarization was present in the faxes that were sent in the Character/photo mode. Outlines only with no fine detail present.

Acceptable quality was displayed in the faxed bulletins when the character/high resolution/automatic mode was used.

In all cases the halftones dots in the original bulletin were exaggerated in the photocopy and faxed copies, giving the photo a mottled look.

Newspaper clippings(Black/white): The original was not a true white but an off white typical of newsprint. All photocopies were of excellent quality except when copied in the photo mode.

The faxed copies were somewhat split between excellent and poor. Faxes sent in the character mode were of an excellent quality but when sent in the photo or character/photo modes there was a dark overall greying and loss of detail.

Newspaper clippings(colour): Photocopies in the character and character/photo mode were of excellent quality. In the photo mode there was an overall dark greying effect.

The faxed copies were poor in the photo and character/photomode and excellent in character/high resolution/ auto mode.

CONCLUSION: The Canon L6500 Group 4 Digital fax does a superb job of faxing a copy of a hardcopy colour or black/white photograph. Quality is good on most exposure settings in the photo mode. Photocopies of the original photos have good detail and are easily corrected for proper exposure.

In faxing copies of newsprint, it was found that once you established a correct setting and mode an excellent end product can be obtained. The newsprint and bulletin contained photographs that were halftoned for the printing process and this presented a problem when using the photo mode. In this mode it also incorporates a halftone which when put on top of the other existing halftone exaggerates the dots and at times causes polarization or a moiré effect. For these types of documents the character mode proved to be the most effective.

The L6500 is the only efficient way of transmitting high quality copies of photographs and documents between Police Agencies.

FASTER, CHEAPER, HIGHER QUALITY, EASIER TO USE.

TEST # 9

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To fax fingerprints and photographs from Group 3 fax to another Group 3 fax.

METHOD: During this test two sets of inked fingerprint forms one colour photograph with a dark skinned person, one colour photograph with a light skinned person and a black and white photograph were used. Copies were send using the normal transmission and the photo halftone mode.

RESULTS: The faxed photographs in the standard mode over the Group 3 fax had no visible detail, other than an outline. In the halftone mode the photographs were just distinguishable and very heavily pixelized. Extremely poor quality

There appeared to be sufficient detail in the faxed sets of fingerprint forms but, Upon closer examination under a fingerprint glass and even when enlarged on the copier it is readily visible that the ridges are so broken up that it is impossible to make an identification.

CONCLUSION: The Group 3 fax should never be used to fax fingerprints for identification purposes. Quality is extremely poor and no adjustments can be made to better the quality. It is a low resolution system and not suitable for FIS functions, other than to fax character data where quality is not an issue.

Photos faxed over the G3 system in the photo halftone mode should only be done so in cases of emergency.

The Group 4 Digital fax is far superior to any Group 3 fax.

TEST # 10

CANONL 6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To evaluate the use of the L6500 fax for the transmission of shoe impressions.

METHOD: During this test, Ottawa faxed an original footprint impression that was dusted on clear plastic, a footwear impression on a brown manilla envelope and an actual shoe placed on the copier.

RATIONALE: During the course of many investigations it becomes necessary to exchange information between Police agencies that may involve tire-prints and footwear. In some cases this information is needed ASAP and normal Group 3 fax will not give the needed quality and detail.

The high quality resolution of the Group 4 was expected to offer that quality.

RESULTS: The faxed copies that we received from the RCMP were returned to the RCMP for their evaluation. See Appendix "A" for the full report from the RCMP. Having viewed the faxes, we concur with the findings of the RCMP.

In regard to the actual sole of the shoe, faxed copies are in Appendix "B", the resolution was good but loss of definition was apparent from one fax copy to next. This could be attributed to the degree of density used on the fax settings.

Toe area was upturned away from the glass plate and is only partially there. The heel section of the sole is missing but was caused by an error at our end. The printing system will automatically jump to the next paper tray if the paper tray that it is drawing from runs out of paper. It was set to receive on 8 1/2" x 14" paper.

CONCLUSION: Although this test proved to successful, there is a need for more study in the area of pressure, full shoe impressions and powdered prints, etc.

There is concurrence by both Forces that there is considerable loss in faxing directly from the original, but vast improvement when the original is photocopied on the L6500 and then faxed.

It would be an useful tool to transmit information on size, pattern and shape. There may not be enough definition to prepare an identification chart for court.

TEST # 11

CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To photocopy a set of impressions from a C216 and a latent **lift** to see if the quality **of the** photocopy was sufficient to produce a chart.

METHOD: A right middle fingerprint impression was copied from a C216 at various degrees of enlargement. The same procedure was used for a found crime scene latent impression. The quality of the copies were checked for loss of detail and clarity.

RATIONALE: To see if it was feasible to use the copier as an enlarger for **the** preparation of a fingerprint chart.

RESULTS: Enlargements up to the maximum of 800% produced copies that were acceptable for comparison but not of the quality that is needed for a chart for court purposes.

CONCLUSION: Using the L6500 would be an efficient method of producing enlargements in the initial preparations for a chart and marking out points of identification.

Not an acceptable method for the production of a chart.

TEST # 12 CANON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To evaluate the quality of the photocopies from the L6500 and a standard photocopy machine.

METHOD: A Government of Canada cheque which had a purple coloured fingerprint impression of the back side was photocopied on the L6500 at 100%, 200% and 400% at various settings.

The same cheque was put on a standard photocopier at settings of 100% and the maximum enlargement of 155%.

RATIONALE: To compare the clarity, definition loss and enlargement capabilities.

RESULTS: The enlargements on the L6500 suffered very little loss of definition up to the 400% mark which is a standard size (4 diameters) for a fingerprint chart.

There was no significant visual loss of detail between the settings of high and low resolution at the 400% mark. There was a loss of detail when a setting of 400%, character, high resolution and high contrast was used.

The best of the 400% enlargement was chart quality.

Using the standard copier the copy at 100% was acceptable. At the maximum enlargement for that machine (155%) there was some signs of degradation in ridge detail. Could not be enlarged enough to compare results at the 400% mark.

CONCLUSION: The L6500 digital capabilities produced an excellent photocopy of the purplish fingerprint with very little loss of detail and was of such a quality that it could be used for court purposes. It is also a useful tool to enlarge prints for visual comparison and plotting of points.

TEST # 13

CANNON L6500 GROUP 4 DIGITAL FAX

OBJECTIVE: To test the quality of direct photocopying of an actual palm using the various settings on the L6500.

METHOD: This test involved the placing of a palm on the glass plate of the L6500 and taking a photocopy. Various settings were used in conjunction with different coverings over the hand and using different downward pressures.

RATIONALE: This test was performed to evaluate the quality of the resulting photocopies. Could this digital copier be used to record fingerprints without using inked impressions. FIS is presently researching live scan fingerprinting and **this** was an opportunity to check the possibilities of sufficient ridge detail capture.

RESULTS: The quality of the ridge detail was largely dependent upon the amount of pressure between the glass plate and the palm. Too much pressure resulted in hot spots on the photocopy. Not enough pressure resulted in blurred or out of focus images.

High contrast negative images appeared to be the best of any of the various settings. Negative images resulted in a reversal of the normal ridge colour - appeared as white ridges. The other problem with direct photocopying is the fact that if the copy is not marked, the right hand could be easily mistaken for the left hand.

CONCLUSION: Although the L6500 Group 4 fax produced an occasional copy with some detail, it was a hit and miss experiment. Not suitable for the capture of fingerprints directly from the hand.

CANON L6500 GROUP 4 DIGITAL FAX

OTHER:

During the testing period an incident arose where two suspects shot a Metro Officer and fled. Copies of their fingerprints were faxed to us by the old Muirhead system that is in place at the RCMP. MTPF-FIS requested another set of fingerprints be sent by the RCMP via the new L6500 Group 4 Fax.

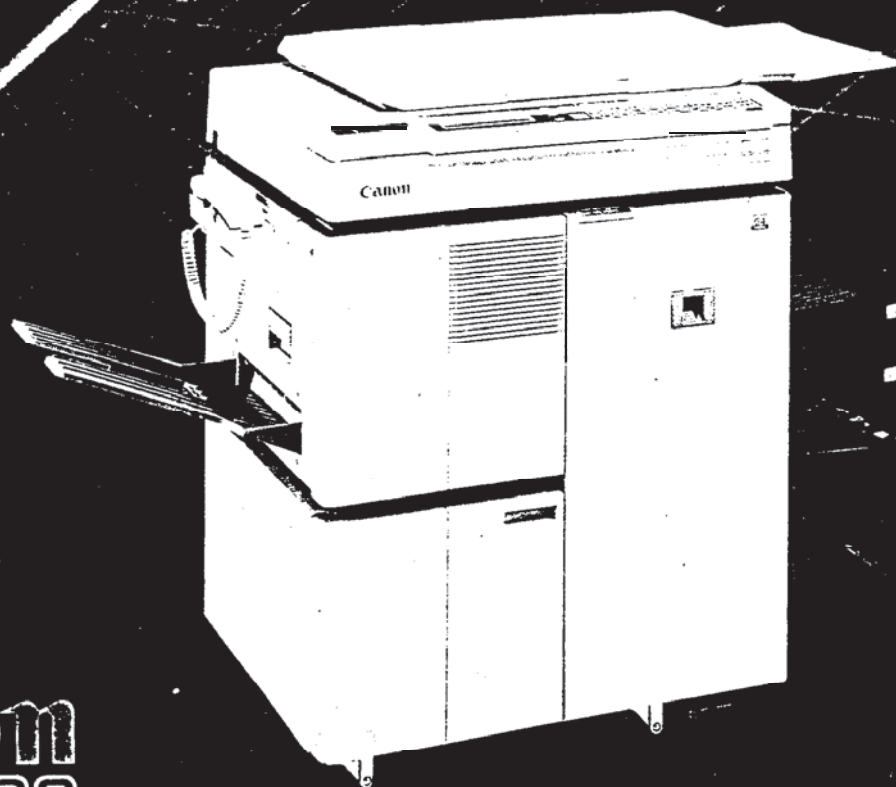
The Muirhead faxed copies were not of a high enough standard to be photocopied and sent out with 1000 bulletins on the two wanted men.

Some time later the two men were captured in Maryland, USA, and confirmation of their identity was requested. Also in talking to Maryland State Police it was found that they had access to a Group 4 fax machine and were requested to fax us a set of palm prints of the two suspects. Unfortunately the data was tied up at the border because of a disagreement between Bell Canada and A.T. & T. over rates. The data did not get to us but this would have been an excellent opportunity to share information and get a look first hand at Group 4 faxing across the border using **the** different phone systems.

With the FBI, New York State and many other Forces in the USA going to Group 4 Fax, it becomes a very important issue for our Force and **the** RCMP, partners in this research project.

The across the border transmissions and related problems have been resolved by the two phone companies. See Appendix "D".

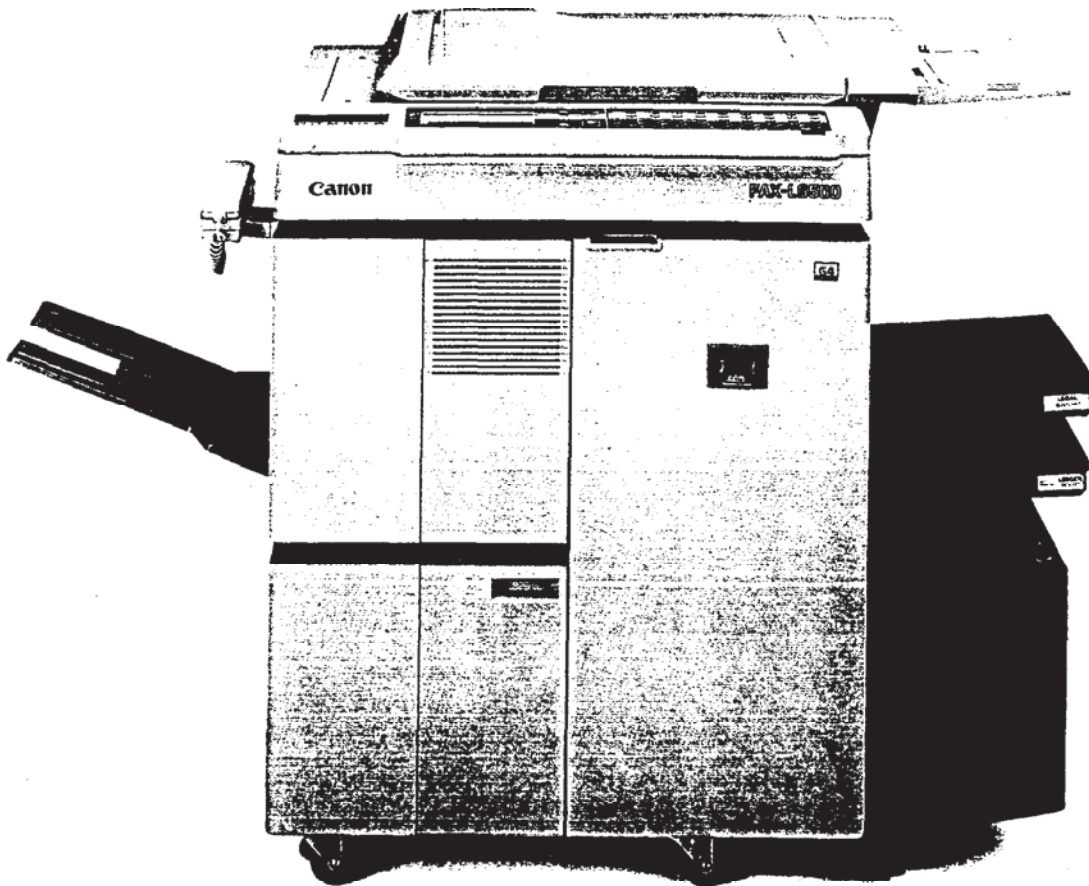
**BEFORE THE FAX-L6500,
EVEN THE MOST EXTENSIVE
COMMUNICATIONS NETWORK
WAS INCOMPLETE.**



Canon
FAX-L6500
COMMUNICATING QUALITY



WITH G3 AND G4 CAPABILITIES COMBINED, THE FAX-L6500 PUTS YOU IN COMPLETE CONTROL.



Meet the brains behind a better fax network: Canons FAX-L6500, the world's first "image terminal" to provide true networking for both Group 3 and Group 4 facsimiles.

One of the secrets behind the FAX-L6500's extraordinary performance is its ability to accept documents from any G3 or G4 terminal, and then deliver them to any other G3 or G4 terminal - without pre-programming!

What's more, fax users can "command" the FAX-L6500 in one of three convenient, efficient ways...

- Using Canon's simple Relay Command (within a Canon fax network).
- Using Canons unique adaptation of highly advanced Optical Character Recognition technology (with Canons exclusive cover sheet process).

- Using a touch-tone phone for direct access. Even in mixed vendor networks, the FAX-L6500 puts you in complete control. It's the ultimate in fax flexibility, allowing you to expand any fax network instantly, control it more efficiently -and communicate more profitably

And the FAX-L6500 features Canons own laser beam printing process, for high speed printing plus high quality image resolution. And laser printing means the FAX-L6500 offers many of the same reproduction capabilities you'll find on the most sophisticated Canon copiers, including flat bed scanning, reduction/enlargement, image conversion and memory functions. So whether it's a fax or a copy you, need, the FAX-L6500 is clearly the best way to get it on paper.

Canons FAX-L6500. Your fax network isn't complete without it.

Th

G3. G4. And more.

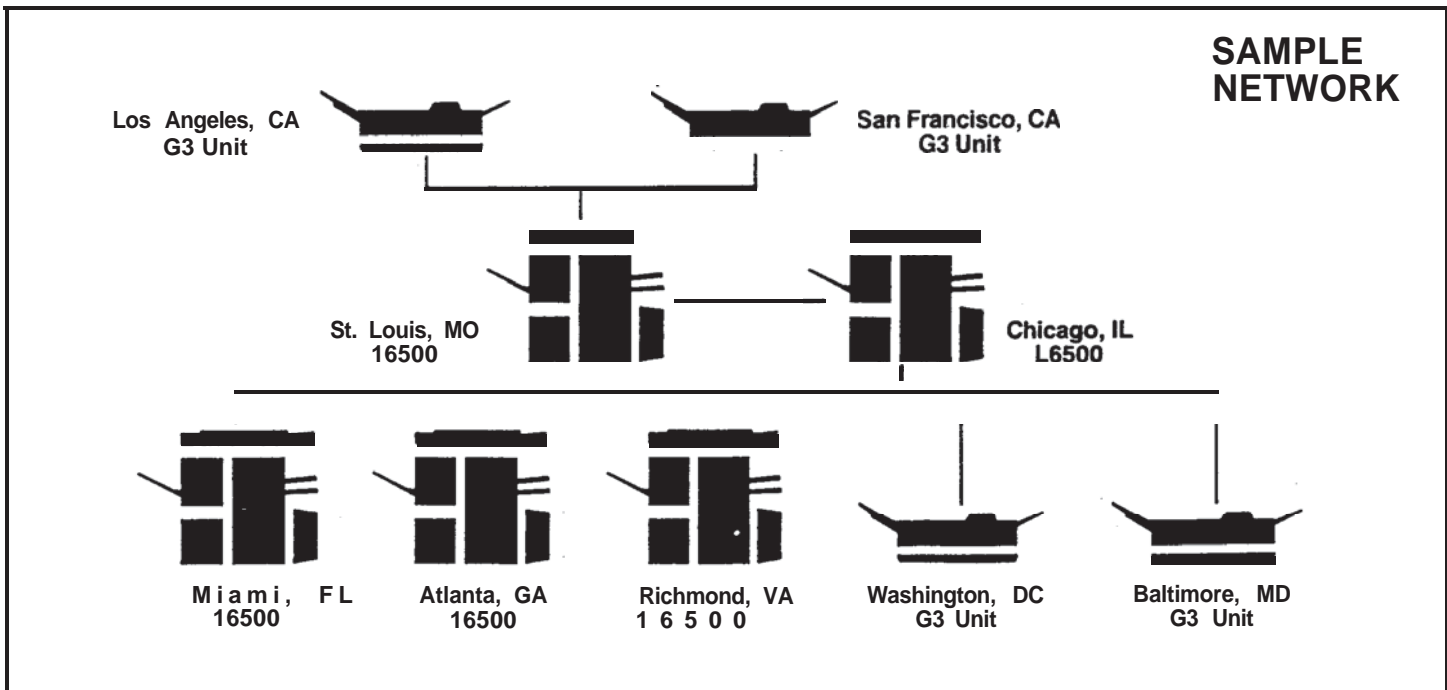
The FAX-L6500 is a G3 machine. And it's a G4 machine. But most importantly, it's the highly advanced Canon FAX capable of handling both G3 and G4 networks on demand. There's never been another fax like it. Incorporating Canon's unique adaptation of OCR technology, the FAX-L6500 gives you instant access to G4 networks. And FAX-L6500 provides ultra high transmission speeds as fast as 3 seconds per page, ultra high resolution at 400 x 400 DPI and completely error-free reproduction. But that's just the beginning! You'll also find a whole range of helpful,



convenient features that make high volume faxing a highly productive way to communicate. Canon's FAX-L6500. Now you can expand your communications capabilities instantly, while you fax more efficiently than ever before.

Relay Broadcast puts your network to work.

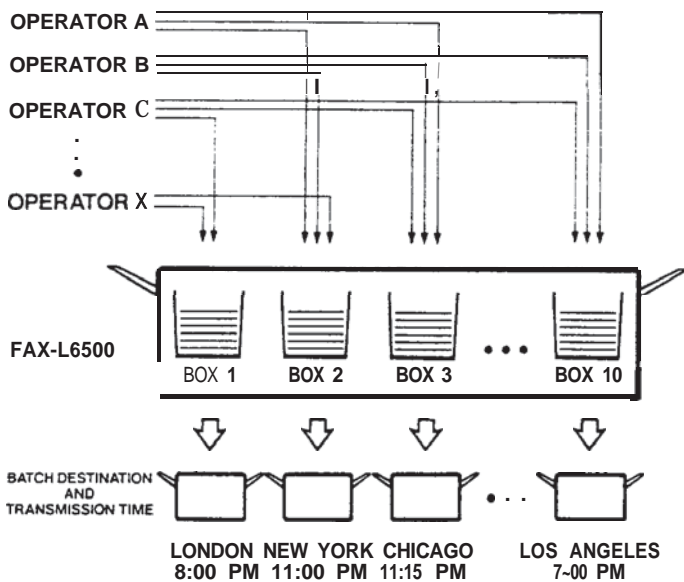
Heavy fax users know the substantial time and cost savings Relay Broadcast provides. But now you can increase those savings even more. With a network of FAX-L6500 units, you're able to create a high speed fax network of your own. Just choose one of the three convenient command modes-either the Canon Relay Method, OCR-cover sheet combination or any touch-tone phone-and the FAX-L6500 does the rest. It will collect documents from any G3 or G4 facsimile, relay them to another FAX-L6500 and deliver them to their final destination. It's never been easier to communicate this efficiently, even if you're transmitting to as many as 160 different locations! With the FAX-L6500, your network works harder.. so you don't have to.



e FAX-L6500 improves you

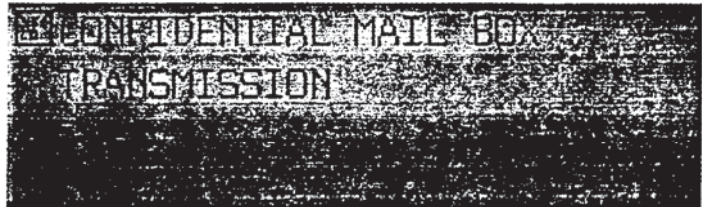
Batch Transmission for even better savings.

Thanks to the FAX-L6500's huge multifile memory, you can store a whole day's worth of documents. Then, at a programmed time, the documents will be sent in a single batch to their respective destinations. The benefits? By transmitting to each location only once, you save time, trouble-and costs.



Confidential Mailbox guards your privacy.

Privacy isn't a problem with the FAX-L6500's Confidential Mailbox feature. You can receive documents directly into one of 32 separate mailboxes, which will hold the information in memory until "opened" with the correct password.

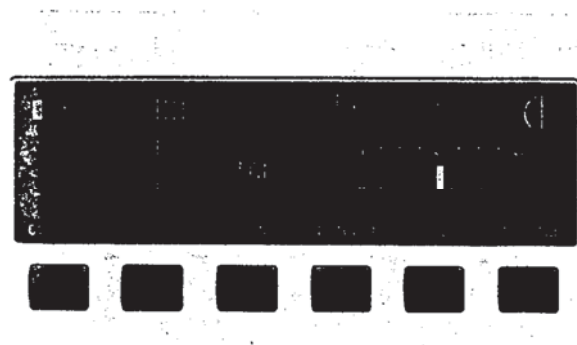


Multi-Polling and Delayed Multi-Polling provide extra information control.

Documents can be polled when and where you need them, from up to 155 different locations, at up to 32 different times. And with coded access, you can be sure of the confidentiality of all your documents.

Delayed Transmission lets the savings come to those who wait.

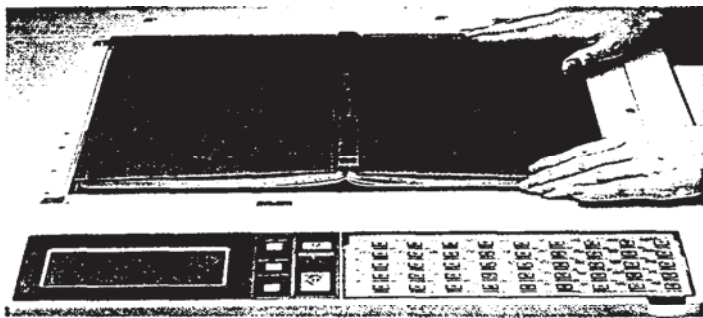
Patience isn't just a virtue, it's also very profitable. The FAX-L6500 conveniently holds your documents for transmission at the most economical time, then sends them, automatically, to as many as 155 locations, at up to 32 different times.



network every step of the

Flat Bed Scanning for fast and easy faxing from books and magazines.

What a convenience-and what a time-saver, too! The FAX-L6500 features flat bed scanning capability, to let you send faxes from books, magazines and other



bound documents directly, without having to copy them beforehand. Just lift the cover, place the original on the glass and fax. It's that simple! Of course, the FAX-L6500 makes it just as easy to transmit single sheets as well. You can stack up to 30 documents in



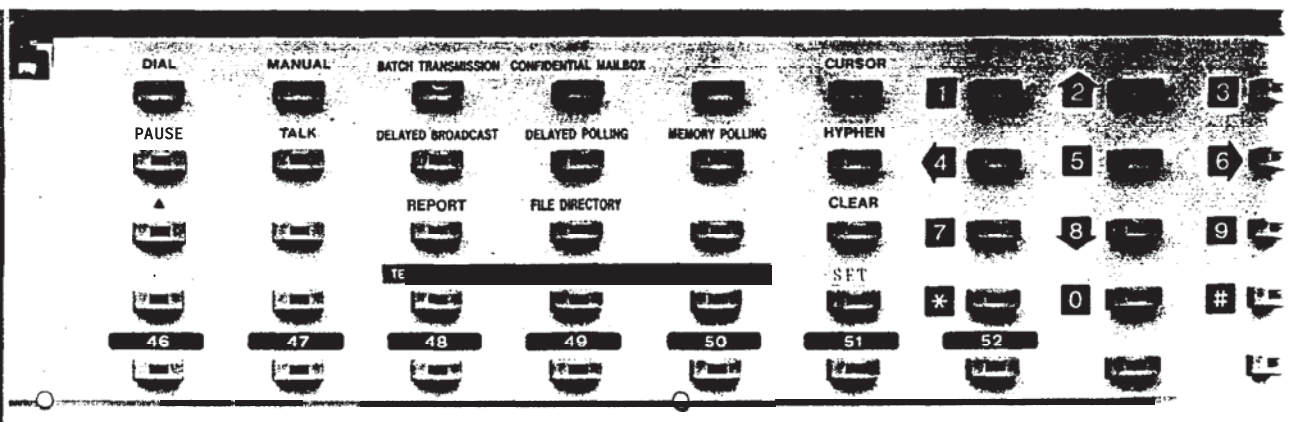
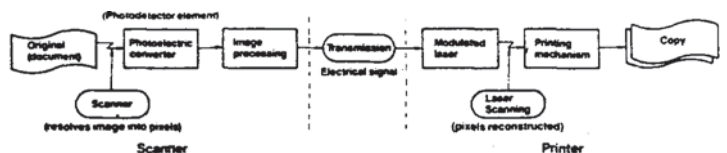
the Automatic Document Feeder and the machine will do the rest. Or, place them directly on the glass of the scanner as if you were making a copy.

Hard Disk Memory for more intelligent communications.

The FAX-L6500 is a very smart choice for your communications needs. 20-megabytes of hard disk memory provide 800 pages* of information storage, retrieval and convenient memory-direct transmission. Plus, 4 megabytes of RAM come built into the system, with an additional 4 megabytes available.

Laser beam printing process makes the fax perfectly clear.

With its digital G4 technology, laser beam printing plus halftones in 64 shades of gray, the FAX-L6500 reproduces the most complex visuals with startling results-and on plain paper, too. Everything from letters and reports to photos and artwork reproduce so clearly, you can even use them as originals! What's more, the FAX-L6500 prints 30 sheets per minute, so you get better faxes, faster.



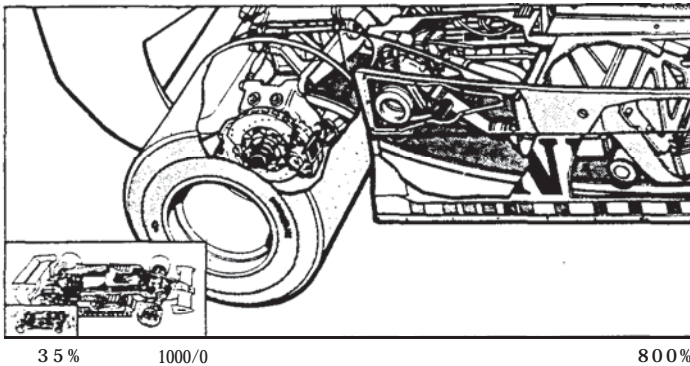
*Based on CCITT Test Chart #1

*AccunetSwitched56 is a registered trademark of AT&T

way.

Fax your original. Copy it. Even change it. All, with just a touch.

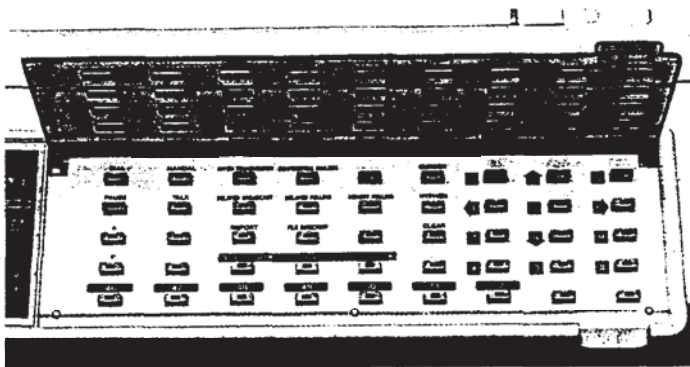
You might think of a number of different ways of looking at your communications, and with the FAX-L6500, it's easy to get them down on paper. Canon's advanced laser beam printing process lets you reduce and enlarge images—from 35% all the way up to 800%—and much more, all with the touch of a key



More communication convenience.

One-touch Speed-dialing/Coded Speed-dialing.

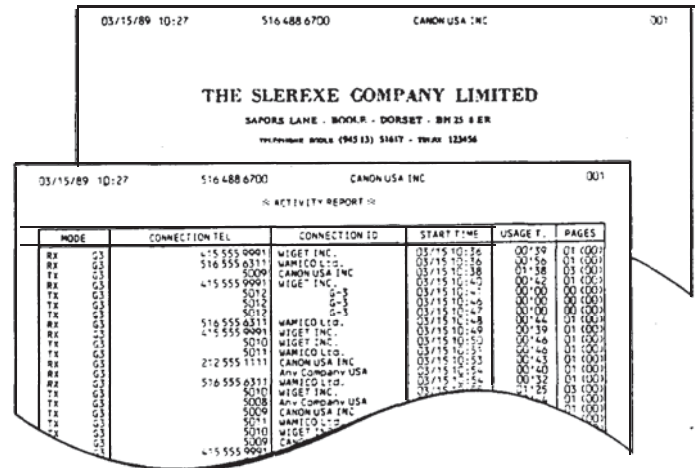
The FAX-L6500 saves you the time and trouble of dialing frequently used numbers. With just the touch



of a key you can instantly reach as many as 552 different locations around the world. (52 one-touch numbers; 500 coded numbers.)

Sequential Broadcast. For extra fax flexibility, automatically. Just feed your original once, and the FAX-L6500 can send it up to 155 different locations, at up to 32 different times.

TTI & RTI. Instant, easy identification for both sender and receiver. The FAX-L6500's TTI feature prints your name, number, date, time sent and page number at the top of every document you send. RTI shows receiver's identification on the LCD display.



Memory Reception. Guarantees information will never be lost if the FAX-L6500 runs out of paper. Up to 32 transactions (up to 800 pages) can be stored in memory, which print out automatically when the paper is replaced.

Automatic Feeding. When transmitting, the FAX-L6500 can feed up to 30 documents, up to 11" wide. incoming documents are collated in the order they're received.

Paper Versatility. With a 2,000-sheet letter-size paper deck, the FAX-L6500 provides virtually uninterrupted performance for even the biggest fax jobs. And twin paper trays for legal- and ledger-sized sheets let you get your faxes—and your copies—just the way you want them.



FAX-L6500 SPECIFICATIONS

Type: Group 4 Class 1. Group 3 Facsimile Transceiver

Applicable line: X.25 Packet Switched Network
X.21 Circuit Switched Network
Analog, Digital, Leased Lines
Public Switched Telephone Network

Interfaces:

Group 4: V.35, X.21 (V.11), X.21 bis (V.28)
X.21 bis/RS366A (automatic dialing Interface)

Group 3: RJ-11C
Optional additional G3 port

Communication Standard: CCITT Group 4 Class 1 and
Group 3 Facsimile Recommendations

Data Rates:

Group 4: 2.4K-64Kbps
Group 3: 2.4K-9.6Kbps

Transmission Speed:

Group 4: 3 sec. (CCITT #1 chart at 200x200 DPI/64Kbps)
Group 4: 4 sec. (CCITT #1 chart at 200x200 DPI/56Kbps)
Group 3: 12 sec. (CCITT #1 chart at 203x98 DPI/9.6Kbps)
Group 2: 3 minutes. (CCITT #1 chart)

Tx Reservation: 8 calls for Tx dialing queues

Confidential Rx: 32 calls (max.) for 4 digits ID codes

Handset: DTMF Push Button type mode

Document Size: Letter, Legal, Ledger (for Sheet and Book mode)

Scanning Resolution: 400x400, 200x200, 200x100 DPI for G4
406x392, 203x196, 203x98 DPI for G3

Scanning Speed: 10 pages/mln. (at Letter size CCITT #1 chart)

Effective Scanning Area:

	(W)	(L)
Letter:	8 1/2" x 11"	
Legal:	8 1/2" x 14"	
Ledger:	10 7/8" x 17"	

ADF: 30 sheets of paper (max.)

OCR Unit: Optional

Printer Type: Electro-photographic LASER beam printing

Printing Resolution: 400x400 DPI

Printing Speed: 30 pages/min (Letter size copy from memory)

Recording Paper Size: Letter, Legal, Ledger (cut sneer)

Effective Printing Area:

	(W)	(L)
Letter:	8 3/8" x 10 1 3/16"	
Legal:	8 3/8" x 13 1 3/16"	
Ledger:	10 1/2" x 16 1 3/16"	

Paper Cassette: 250 sheets x 2 cassettes
2000 paper deck for letter/legal size sheets (optional)

Paper Tray: 100 sheets paper tray
400 sheets paper tray (optional)

Halftone: 64 shades of gray

Halftone Method: Dither method

Image Enhancer: Block adaptive thresholding method

Image Compression: MMR (G4), MR, MH IG3

Enlarge/Reduce: 35-50% (for both copy and communication)

Image Editor: Black/White conversion etc.

Multi Copy: Up to 99 sheets of paper

Image Memory: 4 Mbytes DRAM
Additional 4 Mbytes DRAM (optional)
20 M bytes Hard disk

Memory Reception: 32 receptions (max.) up to 800 pages*

Power Supply: 120 V ± 10% 50/60Hz

Power Consumption: 530w (Idling), 1670w (Printing)

Dimensions (WxDxH): 577/8" x 26" x 40 1/8"
(1470mm x 660mm x 1020mm)

Weight: 397 lbs. (180 kg)

Features: Protocol conversion:
G3 to/from G4; G4 to G2; G3 to G2
High speed laser printing
Ordinary cut-sheet plain paper
Automatic Dialing
One-touch Speed-dialing: up to 52 locations;
Coded Speed-dialing: up to 500 locations
Relay Broadcast: 160 locations
Batch Transmission
Manual 10-key dialing
Sequential Broadcast: up to 160 locations
Multi-Polling up to 155 locations
Transmission to Confidential Mailbox
Confidential Mailbox
Fine Mode
Flat-bed scanning
Hard disk memory
Automatic reduction/enlargement
Halftones in 64 shades of gray
TTI (Transmitter Terminal Identification)
RTI (Remote Terminal identification)
Memory Reception: up to 800 pages*
Automatic Feeding: up to 30 sheets

*Based on CCITT -1 Test Chart

Specifications subject to change without notice

This product is a "Strategic Product" subject to the COCOM regulations. It must not be exported without authorization from the appropriate governmental authorities.

Canon

FAX-L6500

COMMUNICATING QUALITY

National Headquarters: 6390 Dixie Road, Mississauga, Ontario L5T 1P7 (416) 795-1111
Calgary: 2828-16th Street N.E., Calgary, Alberta T2E 7K7 (403) 291-4350
Montréal: 10652, Côte de Liesse, Lachine, Québec H8T 1A5 (514) 631-8821

G4

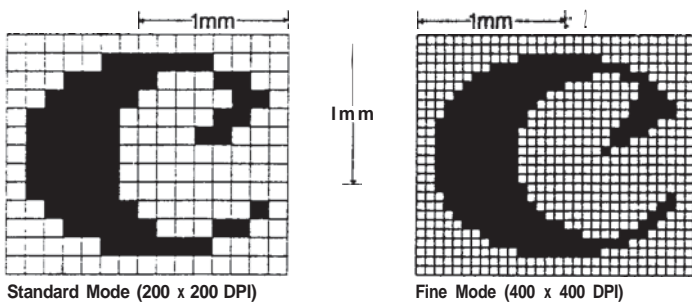
Highly advanced G4 digital technology has already transformed the way many businesses communicate, by providing an enhanced level of performance that lets busy, high-volume fax users transmit the most vitally important information anywhere, with complete confidence. And with very impressive results.

Absolute document integrity.

You can't go wrong with the FAX-L6500's G4 technology, because every document you send or receive is continuously checked for errors-which, if they occur, are corrected as they happen. From an engineering firm's schematic diagrams to an accounting firm's balance sheets-anywhere absolute document integrity is required-the FAX-L6500 is the perfect way to communicate.

Increased document throughput.

Increased document throughput simply means you can fax more in less time--500% more information compared to G3 faxing, in fact! With G4, the FAX-L6500 transmits very urgently needed documents instantly, at a super-fast 3 seconds per page? And it's fully compatible with G3 units as well. So whether you need G3, G4, or both, you've got the ability to choose the best route(s) for your faxes to follow. For the most efficient communications ever.

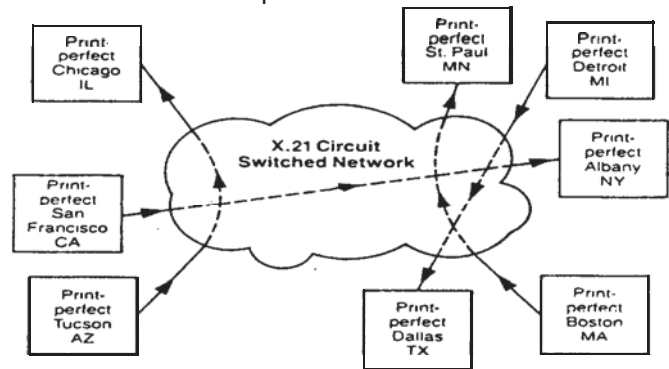


Incredible image reproduction.

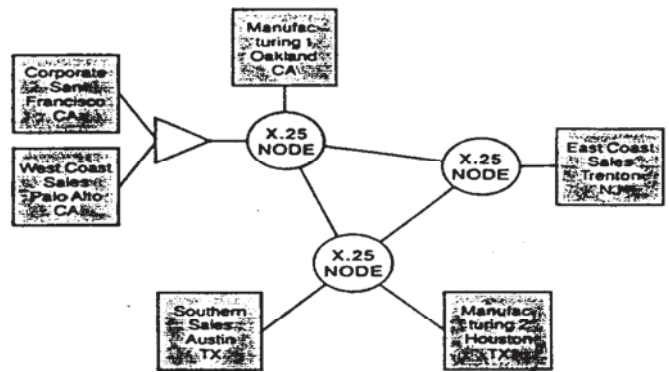
For the clearest communications picture possible, you can't do any better than the FAX-L6500's fine mode. At 400 x 400 DPI, it provides 4 times the resolution of standard G4 mode (8 times the resolution of standard G3), allowing fine print, detailed drawings, photographs and any complex visual to come through so crisp and clear, they can even be used as source documents! With the FAX-L6500, your communications are clearly better.

The harder working network.

Let's say you already have a group of G3 facsimiles in place. When you introduce the FAX-L6500's highly advanced capabilities, your existing group of G3s suddenly grows into a complete communications network, offering smooth operation on both analog and digital lines. Canon's FAX-L6500 switches between both networks, allowing you to take advantage of the most time-efficient and cost-effective method of information transfer possible.



For example, you'll increase performance and lower costs when your network of G3 facsimiles is able to link up with X.21 circuit-switched networks, such as AT&T's Accunet Switched 56 Service or any other of the growing number of switched 56 services available. And only the FAX-L6500 lets you establish that link with Canon quality



With so many companies making X.25 networks their choice for improving internal and international communications, G4 accessibility becomes even more of a necessity. The FAX-L6500 gives you that accessibility, because it's completely compatible with CCITT X.25, used today in many public and private packet-switched networks.

AT&T to Offer Global 'Switched 56-kbit/s Service

Carrier plans connections from its points of presence to PTTs and local exchange carriers

By Peter Heywood and Lee Keough

The era of global, end-to-end switched data services is about to begin. AT&T this month plans to file a major tariff offering that will connect its switched 56-kbit/s service to many U.S. local exchange carriers (LECs) and the national ISDN services of foreign PTTs. The likely result is multinational switched digital services for applications like videoconferencing and leased-line backup at drastically reduced prices.

The new service will bridge the gap between the AT&T 5ESS switches located in the LEC's central offices and the

AT&T 4ESS switches installed at AT&T's points of presence (see figure). Until now, the two switches could not share common signaling at 56- or 64-kbit/s rates. Recently, the regional BOCs have been installing software upgrades to the AT&T 5ESS and Northern Telecom Inc switches at central offices, enabling them to communicate via ISDN.

AT&T also plans to expand the tariffed service to 64 kbit/s, and possibly to the ISDN basic-rate interface (BRI), later this year.

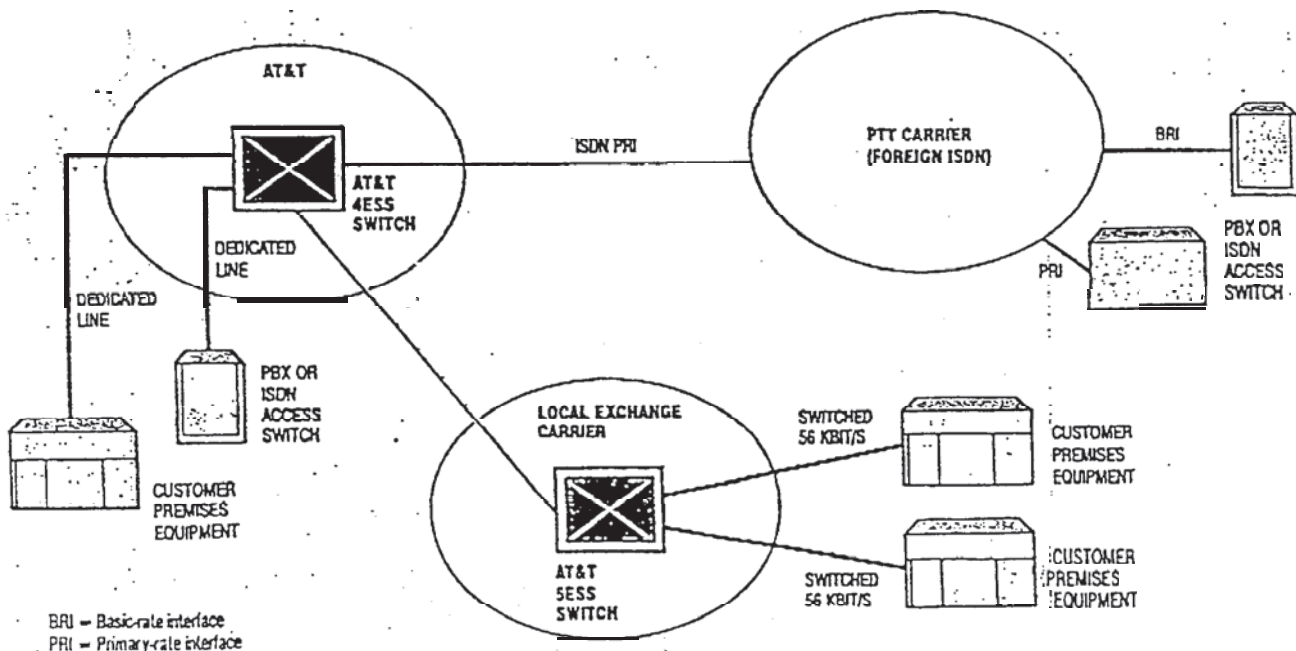
AT&T International officials say the service will be available in most major U.S. cities and many countries, particularly those with national ISDN service, such as the U.K., France, Japan, Australia,

Hong Kong, and Singapore.

The actual tariffs have not yet been set, either; AT&T was still negotiating with the LECS and PTTs at press time. Nevertheless, since corporations no longer will have to lease a dedicated TI or ISDN primary-rate interface (PRI) to the point of presence, the cost of international data service should come down markedly.

Long-distance networks already support ISDN services and are being linked to a growing list of national ISDNs around the world. US Sprint Communications Co. (Kansas City, Mo.) has been running a switched 56-kbit/s service based on Northern Telecom switches since February 1990, but Sprint has yet to establish

AT&T International Switched Data Services



links to many foreign PITS. So far, it has global virtual private network service to the U.K. and Hong Kong and has announced connections to Canada and the Netherlands. A spokeswoman for Sprint notes that until recently there have been limited switched data services available from LECs, slowing the availability of the service. The number of Local Access and Transport Areas (LATAs) supporting switched 56-kbit/s service is growing, however. MCI Communications Corp. (Washington, D.C.) says it will connect its switched 56-kbit/s service to LEC central offices in the second quarter of this year.

Until now, many users wanting end-to-end international services from the U.S. have had to bypass the LECs, instead leasing dedicated lines or renting an ISDN PRI directly from AT&T or other long-distance carrier. A U.S. PRI consists of 23 B channels and 1 D channel, each 64 kbit/s, and can be divided using a PBX or other device to support different applications.

Since U.S. long-distance carriers do not offer ISDN's BRI, which comprises two 64-kbit/s B channels and one 16-kbit/s D channel, and only a few regional BOCs provide BRI, users who do not need the sort of capacity that comes with PRI have been unable to obtain switched digital services for the U.S. side of an international BRI link.

Of course, the new AT&T service will not offer end-to-end ISDN immediately. But it will be a leg up on a data version of the "call anyone from anywhere" thinking that marks the telephone network, says a source at British Telecom PLC (London).

AT&T also plans to introduce a domestic 64-kbit/s switched service in the next few months. Doing so will eliminate the need for ISDN rate adaptation, which requires a blank bit to be inserted after every seventh bit of data in a 64-kbit/s stream so that data can run over a 56-kbit/s circuit.

INTERNATIONAL WINNERS

European users also will benefit from AT&T's tariff offering. "Most of our clients want BRIs on the American side [of the Atlantic]," says Igor Douplitzky, assistant vice president of business development at France Télécom's New York office. Now those clients will be able to get the next best thing—a BRI from

France completed by a switched 6-kbit/s service in the US, all the way to the final destination.

European users don't face the problem of getting switched data services because they have national ISDNs and carriers provide both PRIs (comprising 30 B channels and one D channel in Europe) and BRIs. As a result, end-to-end connections between European ISDNs are now being announced on a regular basis, although the availability of ISDN within different countries is patchy.

France Télécom's claims that its ISDN service, Numeris now has national coverage, although links with AT&T's switched 56-kbit/s service are largely handled by a pre-ISDN switched 64-kbit/s service called Transcom. The first of about 50 users of these links are now being moved from Transcom to Numeris with the promise of a reduction in call setup time from 40 seconds to four seconds.

British Telecom says it also has about 50 users for a link between its switched 64-kbit/s pre-ISDN service, called Integrated Digital Access (IDA), and AT&T's 56-kbit/s Accunet service. British Telecom plans to launch a commercial BRI service called ISDN2 in January and says it has enough equipment on order to provide coverage in all major areas by year's end.

A switched 64-kbit/s link between AT&T and Japan's international carrier, Kokusai Denshin Denwa Ltd., and its domestic carrier, Nippon Telegraph and Telephone Corp., was demonstrated last March.

END-TO-END ISDN

Linking U.S. LECs and European ISDNs will offer advantages beyond greater capacity. For example, signaling on the D channel makes it possible to integrate two B channel calls in one application.

But providing the requisite BIUs means the PBOCs need to invest heavily in order to implement ISDN's Common Channel Signaling System No. 7 in local exchange networks. There are at least two ways in which local telephone companies can deliver BRIs in advance of general network upgrades—using AT&T's **Definity** PBX and via an IAP6000 ISDN Access Server from Teleos Communications Inc. (Eatontown, NJ).

The Teleos gear splits PRIs into BRIs or bunches of B channels and routes

traffic between networks using different signaling systems. It is now being used by corporations that must connect private ISDNs with public networks and split up PRIs for different applications.

Teleport Communications Group (New York) used the Teleos IAP6000 in a demonstration of what France Télécom's Douplitzky calls the "first end-to-end transatlantic BRI," at the Communications Managers Association (CMA) trade show in New York last October.

The star exhibit was an application using both B channels of a BRI that will go into service for a major international bank as soon as terminals get attachment approval in France, Germany, and Britain. The terminals, which are PCs fitted with boards and software from ICL PLC (London), are already in use in the U.S. and are also the basis of a project to develop ISDN applications at Bell Communications Research (Bellcore, Livingston, N.J.). ■

CANADIAN COMMUNICATIONS SERVICE

Products
P-SW56-124
December 5, 1990

Title: Switched 56 Kbps Service is Now Available

Summary: Bell's new 56 kbps service is practical for a range of applications. It can also be a cost effective alternative to dedicated 56 Kbps service in some cases.

Switched 56 Kbps service has been available in the United States for about three years it recently became available as a Centrex data offering in Canada. AT&T's MegaCom switched 56 service has proven itself to be extremely useful and cost effective for specific applications and has experienced strong growth. We expect the Canadian service to be equally popular.

There are differences between the U.S. and Canadian service. In Canada the service is based on Centrex (see accompanying Research Note P-CTX-126) and there is a two-line minimum. The lines can both be data, both be voice or split between data and voice. The United States does not have a two-line minimum. The pricing scheme for connect time is the same in both countries. It is equal to the applicable voice long-distance tariffs. The service is available nationally through Telecom Canada. We expect the Telecom Canada and AT&T services to be interconnected to provide service throughout North America no later than 4Q91 (0.9 probability).

Technically, switched 56 Kbps service should be stable and deliver high quality. This is a result of the high percentage of digital switching equipment in the telco plant. We expect that most Centrex serving areas in Canada will have access to the public digital telephone network.

Switched 56 Kbps service can address a wide range of applications. It can be a cost effective replacement for dedicated 56 Kbps which is being used for batch data transfers. Dedicated 56 Kbps is often needed because the data transfer rate is required to meet scheduling windows. However, dedicated 56 Kbps is not required in all cases. In fact, switched 56 Kbps can cost effectively replace lower speed dedicated service (e.g., 4800 or 9600) being used for batch applications (see Figure 7). It will not only be less expensive but also will result in a major performance improvement.

Figure 1

Pricing Comparison
(Centrex Switched 56 Kbps vs. Dataroute)

Centrex Speed	Termination Dataroute cost	Sec. 56 Kbps Crossover (Hours/Day)	Sec. 56 Kbps Crossover (Hours/Day) (Overnight)
4800 bps	\$1,054.77	2.3	8.9
9600 bps	\$1,425.88	2.8	7.4
19.2 Kbps	\$1,474.87	3.2	7.7
56 Kbps	\$2,457.20	5.2	12.0

Dataroute Speed	Termination Dataroute cost	Sec. 56 Kbps Crossover (Hours/Day)	Sec. 56 Kbps Crossover (Hours/Day) (Overnight)
4800 bps	\$1,831.92	3.8	7.7
9600 bps	\$2,801.88	3.8	9.8
19.2 Kbps	\$2,782.88	4.8	14.5
56 Kbps	\$4,144.00	5.1	17.7

Note: Dataroute charges are for mileage only (no termination charges). Switched 56 Kbps charges are for usage only (no termination charges), crossover occurs when Dataroute charges equal long-distance charges. To calculate crossover, assume 20 business days per month. Overnight rates are available for nine hours, between 23:00 and 8:00.

Source: Transition Group and Bell Tariff

Stitched 66 Kbps is a cost effective way to achieve higher performance for certain LAN-to-LAN applications. These include the batch transfer of data and print files as well as software distribution. The transfers could be made by an automated dial-up procedure scheduled for one or more times each day (or overnight). The higher speed will require more expensive telecom hardware for each LAN but the increased cost should be rapidly recovered through savings in carrier costs. The investment is strategic in that the gear will still be useable when telecom prices drop to the point where dedicated 56 Kbps service becomes cost effective.

Switched 56 Kbps at standard long-distance rates will be a boost for Group 4 facsimile. Using Group 4 facsimile with 56 Kbps service may result in savings and improved performance for certain high volume fax applications.

Because the largest component of switched 56 Kbps cost is *connect time*, moving usage to off-hours results in major savings. For example, connect charges between Toronto and Montreal are 39 cents per minute daytime and 16 cents overnight - a *saving* of 60 percent.

The availability of switched 56 Kbps will affect a range of telco services. For connections within intra-city free calling areas it is an alternative to Digital Channel Service (DCS). Switched 56 Kbps connections can be left up indefinitely. There is no tariff restriction regarding connect time duration. DCS 56 Kbps starts at about \$400, per-month and can increase substantially based on circuit configuration but switched 56 kbps costs about \$130 per end and connect time is free. For long haul links, switched 56 Kbps is an alternative to Dataroute dedicated 56 Kbps service and lower speeds such as 4800 and 9600 bps for certain applications (see Figure 1).

The telcos are often criticized for the slow pace of service innovation. In this case, where an important new service has been introduced, the telcos have not taken advantage of the marketing opportunity to improve their image.

We recommend that telecom managers check their usage of dedicated 56 Kbps and lower speed services to identify the cost savings and efficiencies available through moving to switched 56 Kbps. Usage of low speed switched services (i.e., 1200 to 3600 bps) should be reviewed because switched 56 Kbps provides a major performance improvement at the same connect time cost.

Bell Canada has received CRTC approval to its tariff application, reflecting the addition of two new Dataroute Serving Areas (DRSAs) located in other companies' territory.

With this approval, Dryden, Ontario (The Corporation of the Town of Dryden), and Timmins, Ontario (Northern Telephone Limited) will be added to the list of DRSAs located in other companies' territory.

FaxCom Service Charge

Filing Date: 199104 04

Effective Date: 1991 05 11

Bell Canada has received interim approval to its application to the CRTC, to eliminate the service charge of \$50.00 for the connection of each FaxCom line.

For further details, please refer to Infocom Issue No. 4 - April 1991, in the "Data Network Services" category.

ANNOUNCEMENT(S)

FaxCom Service Charge - Telecom Status

Following is the status in each of the Telecom Canada member companies concerning the waiving of the service charge associated with the connection of each Fax-Com line.

Each of the member companies has received approval to waive temporarily or permanently eliminate this service charge as follows:

AGT	- waived until September 4
BELL CANADA	- permanently removed
B.C. TEL	- waived until October 14
ISLAND TEL, PEI	- permanently removed

MANITOBA TELEPHONE	
SYSTEM	- permanently removed
MARITIME TEL & TEL	- permanently removed
NBTEL	- no service charge applied
NEWFOUNDLAND	- FaxCom service to be
TELEPHONE	introduced shortly
SASKTEL	- waived until September 30

Digital Switched Network Capabilities

Bell Canada announces the availability of Digital Switched Network (DSN) capabilities, assuring end-to-end digital switched 56Kbps toll network calling on a Telecom Canada-wide basis. Applicable network usage charges are at prevailing DDD rates.

This capability was developed in response to customer needs for innovative, advanced, high speed switched digital services for domestic, cross-border and international calling on the Public Switched Telephone Network (PSTN).

Through public network services such as ISDN, Centrex Data, Datalink and T1-based digital switched accesses, customers have assured Digital Switched Network calling capabilities for high speed data applications on the Public Switched Telephone Network.

To expand service reach, cross-border connectivity to AT&T's Switched Digital Service 56Kbps will become available on July 3, 1991, at existing DDD rates. Additional programs for connectivity with **MCI** and Sprint are planned for later this year. As well, international connectivity with Teleglobe to the United Kingdom and Australia is planned for October of this year.

Development to provide assured Digital Switched Network 64Kbps capabilities to support ISDN calling and world standards is also underway. Domestic 64Kbps capabilities are scheduled for year-end 1991 availability. Cross-border and international capabilities are planned for mid-1992.

DSN supports network transport requirements for applications such as Group 3 Fax, PC file transfer,

video / freeze frame desktop conferencing, PC shared screen, multi-media conferencing, PBX interworking, telecommuting, private line dial back-up, LAN networking, disaster recovery, etc. Some of these applications are currently demonstrated as live ISDN applications at our ISDN Demonstration Centres.

Applications Description:

DSN provides assured, end-to-end switched digital capabilities for the transport and interworking of Telecom Canada's public network digital access services. Customers subscribing to the various digital accesses such as, Centrex Data and ISDN will use DSN to interwork these access technologies and provide network, transport for the following typical applications:

High Speed Facsimile

Businesses have growing expectations and reliance on facsimile transmissions. Group 4 digital facsimile using DSN satisfies the exacting quality requirement and greatly reduces transmission time for document transfer. A Group 4 fax will also interwork with existing Group 3 devices, allowing fax server and store and forward capabilities.

Desktop Video

The reality of continued economic restraint has pushed the requirement for affordable desktop video conferencing to the forefront. Desktop video is now technically possible and economical using DSN and either two Centrex Data or an ISDN digital access line. DSN's domestic, crossborder and international coverage has greatly reduced the requirement to travel for the face-to-face, urgent meetings and provides considerable travel expense savings.

Personal Computer Screen Sharing

The proliferation of desktop computing has revolutionized how businesses manage their tasks. The need for coordination of development and sharing of PC files has heightened screen sharing requirements. The high data speed capabilities of DSN has improved the use of screen sharing software, allowing the remote applications to appear as co-resident.

Telecommuting

Telecommuting is gaining in popularity with the options it offers employers and employees for alternative work arrangements. Part-time employees, single parents, the disabled and consultants may all use DSN's remote access capabilities to link to corporate video sessions, LANs or databases. Access technologies such as ISDN used in conjunction with DSN extend additional functionality of integrating the voice and data requirement on a single access line.

PBX Interworking

Private networking of PBXs is becoming the norm, dictated primarily by interface requirements and restrictive public networking alternatives. DSN now presents a public data networking alternative for digital T-1 PBX accesses. As well, employing ISDN specifies how non-like PBXs and Centrex-based networks will interwork over DSN, offering expanded connectivity, functionality and savings with a public network based solution.

LAN Bridging

The increased penetration of personal computers in the work place has spurred Local Area Network (LAN) growth. The requirement for wide area networking to connect to multiple and diverse LANs is becoming of importance with globalization. DSN offers the reach, high speed data transport and affordable public networking solutions.

For further information, please contact your sales representative.

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DSN supports network transport requirements for applications such as Group 4 Fax, PC file transfer,

MEMORANDUM

NOTE DE SERVICE

To A
From De

OIC Fingerprint Branch

NC0 iic Latent Fingerprint Operations

Security Classification - Classification de sécurité
Our File - Notre référence GID 1165-2
Your File - Votre référence GL 588-309 (LAB)
Date 91-07-12

Re: Canon Group 4 Fax

Subject
Objet

Further to the correspondence concerning the Canon Group 4 fax project, the 30 day test period has elapsed and the testing is complete. The three areas of concern as stated in the correspondence dated 91-05-06 have been evaluated. The Canon L6500 photocopier and Group 4 fax machine is the best I have seen to date.

The quality of a photocopy of a set of fingerprints is very good and easy to use for any kind of comparison. Of all the fingerprints tested only 108% would have to be copied by a phtographic process. A bad rolled set of fingerprints will still be poor for comparison, regardless of method used to make a copy.

The fax of a set of fingerprints produced by the Group 4 fax is almost as clear as the original master. This is a slight change from the photocopy to the fax, however not sufficient enough to greatly reduce the quality of the set of fingerprints. If a light single image of a set of fingerprint were not of sufficient detail to make a comparison, that digit could be blown up, singularly enhanced and the enhanced copy faxed for suitable comparison.

The fax of a latent fingerprint impression loses considerable detail and renders it unusable. If the latent was absolutely perfect with clear ridge detail, then and only then is there a acceptable product on the receiving end of the fax. The faxing of a latent impression was considered a failure.

Three other areas not previously mentioned were also tested as part of the project. These areas were handwriting, prisoner photographs and footwear/tirewear impressions. The handwriting was considered a limited success, as the faxed product was of sufficient quality to analyse, but the paper used is not durable enough. The faxing of prisoner photographs was considered a total success, and a very useable investigational aid is produced. The faxing of

footwear/tire impressions **was also** successful and a useable investigational aid is produced.

A detail report of all area tested is attached as well as three ring binder showing the results of each test. Both the written report and binder are in order as follows:

Item One: Photocopy of sets of fingerprints

Item Two: Fax

Item Three: Latents

Item Four: Handwriting

Item Five: Prisoner Photographs

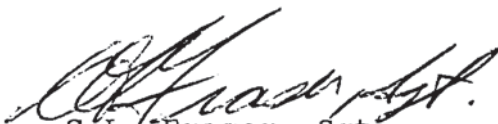
Item Six: Footwear and Tire Impressions.

The other areas mentioned, such as certificates of conviction will be covered by the Metro Toronto **report as** their part of this project

A technical report from informatics directorate is also expected. New York State Department of Criminal Justice completed an extensive technical report on the Group 4 fax and their report is attached in part seven of the 3 ring binder. They have adopted the Group 4 system throughout their State for transmitting fingerprints They have 75 units throughout the State Judicial System.

This photocopier and fax uses ordinary bond paper. The transmission time for a set of fingerprints is approximately 34 seconds at peak hours of the day. The photocopier can handle the requirements of Identification Services for copying fingerprints to send to the field at the cost of one sheet of paper. The cost of the Canon L6500 photocopier and Group 4 fax device and a maintenance agreement is negotiable between the agency and the vendor. There is a one time installation cost from the telephone company and costs for a totally digital telephone line, paid for on a per call basis.

It is recommended that the Group 4 fax immediately replaces the Muirhead system now in place.


C.L. Fraser, Sgt.,
NCO i/c LFO

ITEM ONE: PHOTOCOPY OF SETS OF FINGERPRINTS (C-216)

TEST: To photocopy as many C-216s (rolled sets of fingerprints) as possible, to determine the quality between the photocopy and the original and to determine the possibility of a predetermined setting for various quality sets of fingerprints.

PROCEDURE: A total of 3,000 sets of fingerprints on form C-216 were photocopied and compared them with the master copy.

During this comparison the photocopies were evaluated to determine if it is of sufficient quality for comparison with the original, a latent fingerprint impression, or a another facsimile.

SETTINGS: The settings remained constant in the area of document type (character - character/photo - photo), and resolution (low 100 X 100, medium 200 X 200 and high 400 X 400 dots per square inch) but varied in the density settings, which numbered 1 to 9, and contrast, which was either high or low.

OBSERVATIONS: In our analysis we have found the photocopies produced by the Canon L6500 machine had satisfactory results. In many cases where another photocopier fell short, this photocopier produced better copies.

Where original C-216s were of a light density or little contrast from the rolled inked impressions, the L6500 was able to enhance them to a level where the copies were of better quality than the original.

Where original C-216s were of a dark density or heavy inking from the rolled inked impressions, the L6500 was able to clear the darker areas somewhat and make them more legible.

Even though this copier does improve the overall appearance of some copies, it does not create artifacts or make a bad quality C-216 good.

RESULTS: 80% of all photocopying can be done at a predetermined setting.

20% of all photocopying must be experimented with to produce a satisfactory product.

Of the 20% poor quality C-216s, only .08% of all 10 print C-216s copied were not acceptable for comparison purposes when the master had been.

CONCLUSIONS: The photocopy process of C-216s by this Canon L6500 photocopy machine was very successful. The copy produced is considered good to excellent in quality and is capable of being used for comparison purposes. A poor quality rolled set of fingerprints will remain poor regardless of the coping method used.

The Canon L6500 is considered slow as a photocopier when comparison to other machines that are strictly a photocopier. The main use of the machine is a fax. However for multiple copies are required, it is just a matter of storing the document in memory and then print up to 99 copies rather fast.

The Canon L6500 machine also has energy and cost saving features and uses ordinary bond paper.

ITEM TWO: FAX

TEST ONE: TEN PRINT SEARCH TEST.

The 10 print search test consisted of a number of known FPS files that were faxed from Metropolitan Toronto Police (MTP) force on a daily basis. The test was to determine if the fax print would be of sufficient quality to procure an identification by Automated Fingerprint Identification System (AFIS) computed search.

PROCEDURE: Over the test period we received 170 sets of fingerprints with known FPS numbers. They were sent into AFIS as a priority one search, with match reports generated.

All tests were logged and the respondent position recorded, score separation recorded and misses recorded.

SETTINGS: Settings were controlled from Metro Toronto Police (MTP) as the faxes originated from that point. The L6500 Group 4 fax is reported to print the image transmitted at the same settings as sent.

OBSERVATION: In our analysis we have determined that in all cases the quality of the fax was equal to the searching capability of the master.

In the few cases that a miss occurred the reason had been one of human error or AFIS technical difficulty and not the quality of the reproduced faxed set of fingerprints.

RESULTS: Considering that the human errors should have generated hits, the hit rate was 100% with very good score separation on all cases.

CONCLUSION:

The searching of facsimile fingerprints received on the Canon L6500 Group 4 faxing device produces a superior set of fingerprints as compared to the Muirhead faxing system. The Group 4 system should replace the Muirhead system as soon as possible for searching 10 print fingerprint cards.

ITEM TWO: FAX

TEST TWO: TEN PRINT FAX VISUAL AFIS DISPLAY

To fax five sets of fingerprints from Metro Toronto Police Department, initiate a fax AFIS search and display the respondents.

PROCEDURE: Five known FPS files were sent by G4 fax, searched on AFIS complete with search verification.

OBSERVATIONS: The fax retained its quality during the generation of a search package through AFIS and is very pleasant for display, and could be even better than the inked impression for display.

RESULTS: All five faxes were identified to the FPS file on the AFIS data base. The results of the test showed a remarkable clarity and quality of the faxed print. This enabled the technician to make a quick and confident decision as to whether the print was an identification. As documented in then samples provided, all search prints were identified in the first position with a high score.

CONCLUSIONS: The fax submission cannot only be used in searching the AFIS data base to produce a high score identification, but can also generate a effective search verification package with excellent visual quality.

ITEM TWO: FAX

TEST THREE: TEN PRINT SEARCH TEST MTP AFIS

The 10 print search test consisted of a number of FPS files that Metro Toronto Police (MTP) were known to have on their database. The test was attempting to duplicate test one, only searching on the MTP database.

PROCEDURE: Over the test period we sent 20 known FPS files to MTP.

SETTING: A variety of settings were used, with the best available contrast being the one used.

OBSERVATIONS: It was determined that each set of fingerprints took approximately 34.4 seconds to send. Toronto metro indicated that the images were of superior quality. Of the twenty known FPS files, 19 were on their data base.

RESULTS: All 19 C-216 hit the MTP files, and the test was considered to be 100% successful.

C O N - Although the numbers are small, it is felt that the Canon Group 4 fax is accurate on any AFIS search.

ITEM TWO: FAX

TEST FOUR: TEN PRINT SEARCH TEST

This 10 print search test was conducted with the cooperation of 50 employees from the Fingerprint Branch. The purpose was to test and compare rolled impressions with photocopy impressions from an ordinary photocopy machine, with a Canon L6500 photocopy and with a Group 4 fax.

PROCEDURES:

All employees were fingerprinted. The rolled impressions were added to the database, along with photocopy from the Canon L6500, as well as the master records that were already on the data base. The 50 sets of fingerprints were faxed to MTP and returned by mail. The fax prints were then searched against all three sets on the database.

Several individual fingers were examined under a microscope to attempt to establish differences. The master rolled impression, a photocopy from an ordinary photocopy machine, a photocopy from a Canon L6500 and the fax from the Canon L6500 Group 4 fax were all compared. Three individual fingerprints were photographed to show the differences.

SETTINGS: The variables on the Canon L6500 device were set for each C-216 to get the best possible reproduction. All settings were slightly different and are similar to those reported in Item One of this report.

OBSERVATIONS: A copy of the results recorded are attached and compile part of this report.

In general, all faxes hit on the inked impressions, and on the photocopy impressions. Some of the masters on file were misses due to the fact they were not on the data base at the time of search. Some were human error and one was attributed to minutiae.

PHOTOGRAPHS: On the first photograph where a good rolled fingerprint impression is found all available detail is recorded, including some immature ridges. On the Cannon photocopy, the detail is present and even more visible. The weak lines on the rolled impression are accentuated. There are ~~no~~ artifacts created.' On the faxed impression, there is a slight loss of detail but the detail is excellent, almost as good as the photocopy. On the ordinary photocopy the print is still suitable for comparison, however an extreme amount of detail is lost.

On the second photograph the rolled impression is a little weaker than the first however the results are almost the same. The only difference of note is the fax is slightly broken up. The ordinary copier again loses a considerable amount of detail.

On the third photograph, the rolled impression is considered very poor to start with. The Canon L6500 photocopy is actually better than the original. The fax print, again shown a little loss in quality and an accentuate amount of loss in the weak area of the core. The ordinary photocopy too is actually a little better than the rolled impression. On weak prints, this will always happen. With the enhancing capabilities of the Canon L6500, weak photocopies can be corrected individually, but it remains a problem with the fax.

RESULTS:

The fax searched against its own inked master hit at a rate of 100%, with an average score of 10,889.1.

The fax searched against its own photocopy (binary image) hit at a rate of 100%, with an average score of 10,358.22.

The fax searched against the master on file hit at a rate of 97%, with an average score of 4,379.3.

CONCLUSION:

This device is far superior to anything we have worked with to date.

ITEM THREE: LATENTS

TEST ONE: - PHOTOCOPY AND FAX

To determine if the Group 4 fax device is capable to transmit a latent fingerprint image that is useable on the receiving end.

To determine if the Canon L6500 photocopy is capable of copying a latent fingerprint lift or photograph that is usable.

PROCEDURE: A number of actual latent fingerprint lifts were made as well as a number of photographs of latent fingerprint impressions were collected for copying purposes.

SETTINGS: Every possible combination on the Canon L6500 copier was used to get the best possible copy of the latent.

OBSERVATIONS: Unless the quality of the latent impression was absolutely perfect, it could not be copied or transmitted. Too much ridge detail was lost during the transmission and rendered it unusable. This is true for both lifts and photographs.

When the positive/negative feature was used to change colour of latent fingerprint impressions it was a complete failure.

The best possible fax of any latent was when the original was copied and the photocopy was faxed.

RESULTS: This test was considered a complete failure. Although the tests were suitable for an AFIS search and did generate hits, it was when the original was perfect.

CONCLUSION: The Canon L6500 copier/fax device does not work for latent fingerprints and could never replace the quality of a photophone image. If any agency purchases a Group 4 fax, a latent impression would be received on an extremely urgent case and would have to be followed with a photograph. The Canon L6500 photocopier/faxing device is not recommended for transmission or copying latent fingerprint impressions.

ITEM THREE: LATENTS

TEST TWO: LATENT FINGERPRINT PHOTOCOPY SEARCH TEST

A number of latent fingerprint cases that had already generated an AFIS hit were to be tested using the product of the Canon L6500 G4 photocopy machine.

PROCEDURES: Twenty (20) photographs of latent fingerprint impressions of varying quality that had been sent in from the field were copied using the Canon L6500 photocopier. The best possible copy was made using combinations of settings. The copied latent fingerprint was then captured on the AFIS terminal, encoded manually and searched against the Latent Cognizant File (LCF) data base. Verification packages were generated to discern visual quality.

SETTINGS: The character setting, the high resolution setting (400 X 400 dots per square inch) and normal contrast setting were the most consistently used. The density levels were varied by the technician according to the end result of the fingerprint copied.

OBSERVATIONS: It was determined that in six of twenty cases, that the clarity of the latents actually improved, however many of the other cases detail was absent due to light and dark areas on the same print. It would seem unfeasible to have a produce such as this capable of enhancing parts of an image as is sometimes required when dealing with fingerprints. If the vendor could achieve this, then this produce would be extraordinarily successful for our use.

RESULTS: All 20 cases were hit in the top eight positions and the images were good for display.

CONCLUSION: This machine is capable of copying latent fingerprint impressions that are of some value. Due to the fact some minutiae detail is lost in the copy process, the best available copy is no longer available. Although the results are very encouraging in terms of success, it is still not recommended for routine copying of latent fingerprint impressions and should only be used on an emergency basis.

ITEM THREE: LATENTS

TEST THREE: - LATENT IDENT COMPARISON TEST

The staff at Latent Fingerprint Operations (LFO) were asked to compare latent fingerprint impressions to a photocopy of the master C-216.

PROCEDURES: After a latent fingerprint was identified on the AFIS terminal, each technician was asked to have the master C-216 copied to the best possible photocopy reproduction and then compare the latent to the photocopy C-216.

SETTINGS: All copies were made on character, high resolution normal-contrast and varying density. -

OBSERVATIONS: The technicians had little difficulty operating the photocopy machine, and did not interfere with the normal process. All the technicians were impressed by the quality of the images produced.

RESULTS: All technicians were able to use the photocopy of the C-216 for comparison purposes and none had to resort to the master to reach their conclusion.

CONCLUSION: The photocopy of the master C-216 is of sufficient quality for use in the comparisons of latent fingerprint images, and in some cases the copied C-216 was better than the master. It is recommended that copies of C-216 on the Canon L6500 photocopier be used for sending master copies of C-216s to the field.

ITEM FOUR: HANDWRITING

TEST: To transmit handwriting samples from Toronto Metro Police Department for analysis by Fraud Cheque Section.

PROCEDURES: Copies of handwriting samples were transmitted by the Canon L6500 G4 fax machine and examined by s/sgt Lehmann, NCO i/c Fraud Cheque Section. All handwriting samples were sent by Metro Toronto Police Department to Fraud Cheque Section. No handwriting samples were sent to Metro Toronto.

SETTINGS: All settings were determined from the Metro Toronto and could not be determined at the receiving end.

OBSERVATIONS: According to the Fraud Cheque technicians, the faxes received were clear enough to enable an analysis. On all circumstances, each technician commented that the quality of the fax was sufficient to do their analysis.

RESULTS: A very few number of copies were sent, when S/Sgt. Lehmann advised that any further copies would not serve any useful purpose. A copy of the memo from s/sgt. Lehmann is attached. The paper used by this faxing device is ordinary bond paper, and it not durable enough for the purposes of Fraud Cheque Section.

CONCLUSION: While the handwriting samples itself is of sufficient quality to make an analysis, the paper is not durable enough. The handwriting could be used on an emergency basis with ordinary bond paper. For this machine to be of real value to Fraud Cheque Section, a stronger paper or a method of protecting this paper is required.

ITEM FIVE: PRISONER PHOTOGRAPHS

TEST: To fax a photograph of a suspect at specific settings to determine if they are affected in any way by Group 4 fax in transmission.

PROCEDURE: A number of photographs of prisoners, using various races, were obtained for the test. Some of the photos were in colour and some were back and white. The photos were faxed to MTP at specific settings and returned for comparison to the originals. Photocopies were also made from these photographs at the best possible settings, and were also faxed to MTP and then returned for comparison to the original and the fax.

SETTINGS: In all cases, both colour and black and white the photo setting, high resolution setting and normal contrast were used. The density setting had to be changed on each photograph, according to the visual observations of the technician using the machine.

OBSERVATIONS: There was no noticeable difference between the quality of the colour photos and the black and white photographs after transmission when the settings are adjusted appropriately.

There was no drastic difference between the photocopied transmission and the first generation faxed transmission, although there was a slight loss in contrast with the photocopy fax.

RESULTS: All photographs and photocopies transmitted arrived with excellent quality.

CONCLUSION: The fax and the fax photocopies are of sufficient quality to be used as an investigative aid by any police officer. The copies generated could also be compared to the original photograph very easily. The Canon G4 fax and L6500 photocopier is an excellent means of copying photographs for investigational aids.

ITEM SIX: FOOTWEAR AND TIRE IMPRESSIONS

TEST: To photocopy and fax various footwear and tire impressions to determine if of any value as an investigative aid.

PROCEDURE: Photographs and lifts of several footwear impressions were obtained showing an impression in snow, on a brown envelope and clear plastic. A photograph of a tire impression in soil was also used. Two running shoes were used where a direct copy was made from the sole of the shoe.

SETTING: Various settings were tried, however the character setting, high resolution and varying densities were used from the lifts and dusted impressions. The photo setting was determined to be best for the photographs.

OBSERVATIONS: Using an original footprint impression that was dusted on clear plastic, a considerable loss of detail was observed in faxing process. The image on the receiving end was broken up. When the original was photocopied, the results were equal to the original. When the photocopy image was transmitted by fax, the quality on the receiving end was equal to the photocopy and did not lose any detail.

Using the footwear impression on the brown manilla envelope, the fax of the original exhibit appears dark. The exhibit could be photocopied very well and is readable. When the photocopy image was faxed, there was a little loss in detail, however it still very useable.

Using the actual sole of the shoe, it could be photocopied very well when a cloth object was used for a cover on the photocopier. The detail is extremely sharp. When faxing from the sole of the shoe, a considerable amount of detail was lost, to the point where it is efficacious. Although the photocopy was not faxed, it is believed that the result would be the same as the previous two tests involving photocopies.

OBSERVATIONS : (Continued)

Using the photograph of the footwear in the snow it was observed that the photo setting on the L6500 gave the best results. When the image was faxed, there was a little loss in detail, however it is still useable.

Using the tire impression in soil, the photo setting on the L6500 Canon copier/fax was observed to be the best for transmitting this type of image. The loss of detail in this type of image is not discernable, and the fax looks as good as the photocopy and the original.

RESULTS:

In all instances the photocopy image and the faxed image were of some use. Although positive identification would not be possible on the photographic images copied or faxed, it would still be useable for size, shape and pattern by any investigator. On the clear plastic type images, positive identification could be made with this amount of detail.

CONCLUSION:

The Canon L6500 photocopier would be a valuable aid in copying footwear impressions for investigators immediate use. The faxing device would be a valuable aid in transmitting images between detachments for footwear or tire impression comparisons as an investigative aid. The copies generated would be fast, clear and cheap.