



(25.4) mm
1 INCH

ITEM	REQD	DWG NO	NAME
------	------	--------	------

601-0052135

REF 601-0052142

FUNCTION	IN	OUT	PAGE/ZONE
ACR.V	85	5	B4
BCNT15.GA		65	3 C2
BIT.V		286	2 A2
CDSL.V		295	2 B2
CIND.V	291	5	D4
CRQ.V		96	5 D2
DBR.F		260	3 A1
DCD.V	287	4	C4
DCD.ZA		59	5 B1
DIASYN.L		54	5 A1
DINT.G		50	4 D1
DLO.V	89	5	D4
DPR.V		95	5 B1
DSR.V	290	5	B4
DSS.V	97	5	A4
IOFS.G/		68	4 A3
IPM.F		62	2 D2
IPSO.F.G/		67	4 B3
MOEH.G/		266	2 C1
NB1.V		91	5 D1
NB2.V		92	5 C1
NB3.V		93	5 C1
NB4.V		94	5 C1
NSY.H/		265	2 C2
NSY.V		299	2 C2
OPM.F		60	2 D2
OPRM.F		61	2 D2
PINT.G		49	4 D1

FUNCTION	IN	OUT	PAGE/ZONE
PND.V	90	5	A4
PWI.V	87	5	B4
RD1		204	4 C1
RD2		206	4 C1
RD3		208	4 C1
RD4		210	4 B1
RD5		214	4 B1
RD6		218	4 B1
RD7		221	4 B1
RD8		224	4 A1
RD16		244	4 A1
RDINT		250	4 D1
RD.V	289	3	D4
RD.Z		263	3 D4
RFS.V	288	5	C4
RIM.F		63	2 D2
RPINT		249	4 D1
RQSD1.F		267	5 D1
RQS.V		293	5 D1
RSET.V	297	3	C4
SD1	203	2	D4
SD2	205	2	D4
SD3	207	2	D4
SD4	209	2	C4
SD5	211	2	C4
SD6	215	2	C4
SD7	219	2	C4
SD8	223	2	C4

FUNCTION	IN	OUT	PAGE/ZONE
SD10	228	2	C4
SD11	230	2	B4
SD12	233	2	B4
SD13	235	2	B4
SD15	240	5	A2
SD.G		259	5 C3
SD.V		294	5 C2
SGNDA.V	100	5	B2
SGNDM.V	300	5	B2
SMB7	247	2	D3
SMB9	245	2	A4
MR	46	2	A4
SPT	227	2	B4
SQD.M/	270	4	A4
SQD.V	292	4	A4
SQD.Z/		70	4 A4
SRRCP.G		262	3 B2
SRR.F		261	3 C2
SSEL	251	4	D4
SSTB	248	2	A4
STERM	48	4	C4
STTIM.V		298	2 C2
SYNA.F		64	3 D1
SYNB.F		264	3 D1
TSET.V	296	3	C4
TEST	285	5	C4
TIMOT.H		66	4 A2

SCHEMATIC	NO.
MASTER-CIRCUIT "A"	NO. 601-0052136
MASTER-CIRCUIT "B"	NO. 601-0052137
MASTER-SCREEN "A"	NO.
MASTER-SCREEN "B"	NO.
MASTER-MARKING	NO.
BOARD - PRINTED	NO. 601-0052141
BOARD - PLUG IN	NO. 601-0052142
BOARD - ASSEMBLY	NO.
LIST-DRILL COÖRDINATE	NO.

B	34ER00202	J.V.	10-72
A	34ER00073	GW.V	2-27-71
REV	RELEASE NO.	DFTS	DATE

NOTES:

CHANGES (A) RELEASE NO. (B) M53 - 01 WAS 693-700; .V* IN
MNEMONIC I/O BUS REPLACED BY BAR.

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.

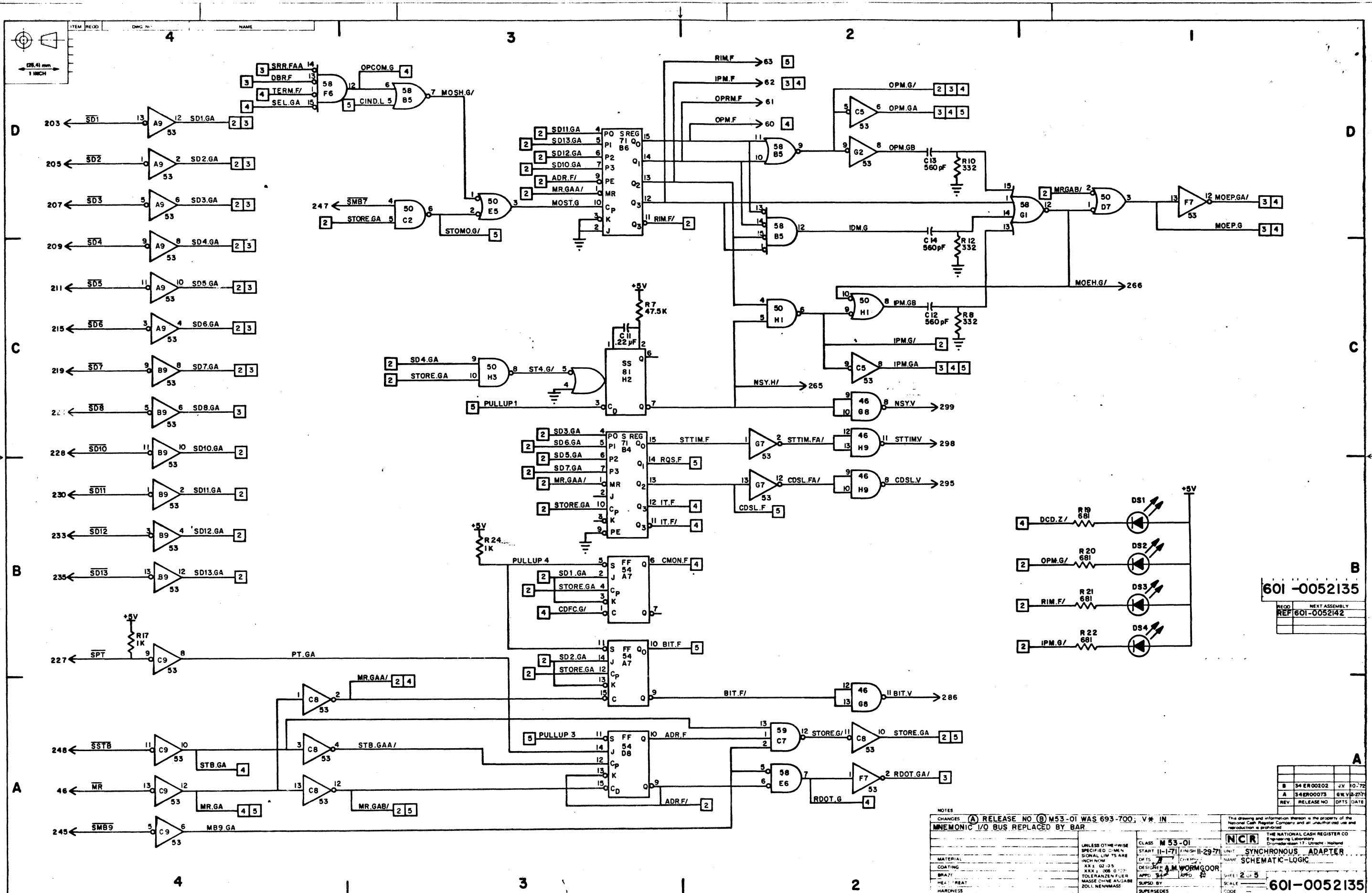
- 4. +12 VOLT PIN 52
- 3. -12 VOLT PIN 51
- 2. +5 VOLT PINS 1,2,201,202
- 1. GROUND PINS 101,102,301,302

MATERIAL	TOLERANZEN FUER MASSE OHNE ANGABE MILLIMETER NENNMASS X, XX ± (0.5) 02 X, XX ± (0.127) 005 UNLESS OTHERWISE SPECIFIED DIMENSIONAL LIMITS ARE MILLIMETER NOM	CLASS M53 - 01	START 11-29-71 FINISH 11-29-71	UNIT SYNCHRONOUS ADAPTER
COATING		DFTS J.V.	CHKR	NAME SCHEMATIC - LOGIC
BRAZE		DESIGNER J. VRQLIJK	APPD	
HEAT TREAT		SUPSD BY		
HARDNESS		SUPERSEDES		

NCR THE NATIONAL CASH REGISTER CO
Engineering Laboratory
Dromedarislaan 17 Utrecht - Holland

601-0052135

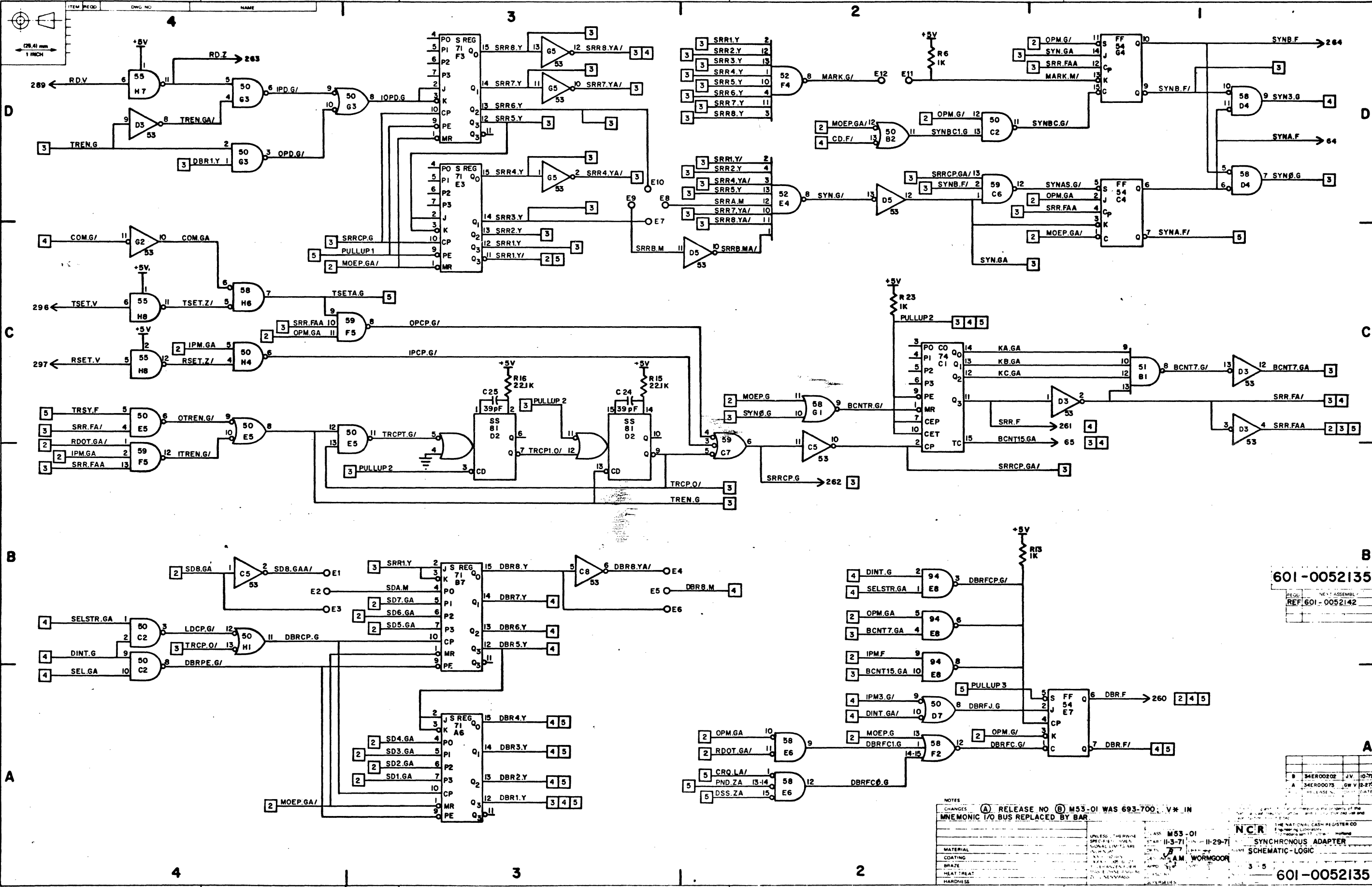
FIELD PRINT



601-0052135

REV	RELEASE NO	DFTS	DATE

NOTES		CLASS M 53-01	
CHANGES (A) RELEASE NO (B) M53-01 WAS 693-700; V* IN MNEMONIC I/O BUS REPLACED BY BAR		START 11-1-71 FINISH 11-29-71	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE INCHES		DESIGNER A.M. WORMGOOR	
MATERIAL		APPD BY	
COATING		SCALE	
DRAFTER		SUPERSEDES	
HEAT TREAT		THE NATIONAL CASH REGISTER CO	
HARDNESS		Engineering Laboratory	
		Cincinnati, Ohio 45202	
		UNIT SYNCHRONOUS ADAPTER	
		NAME SCHEMATIC-LOGIC	
		SHEET 2 OF 5	
		601-0052135	



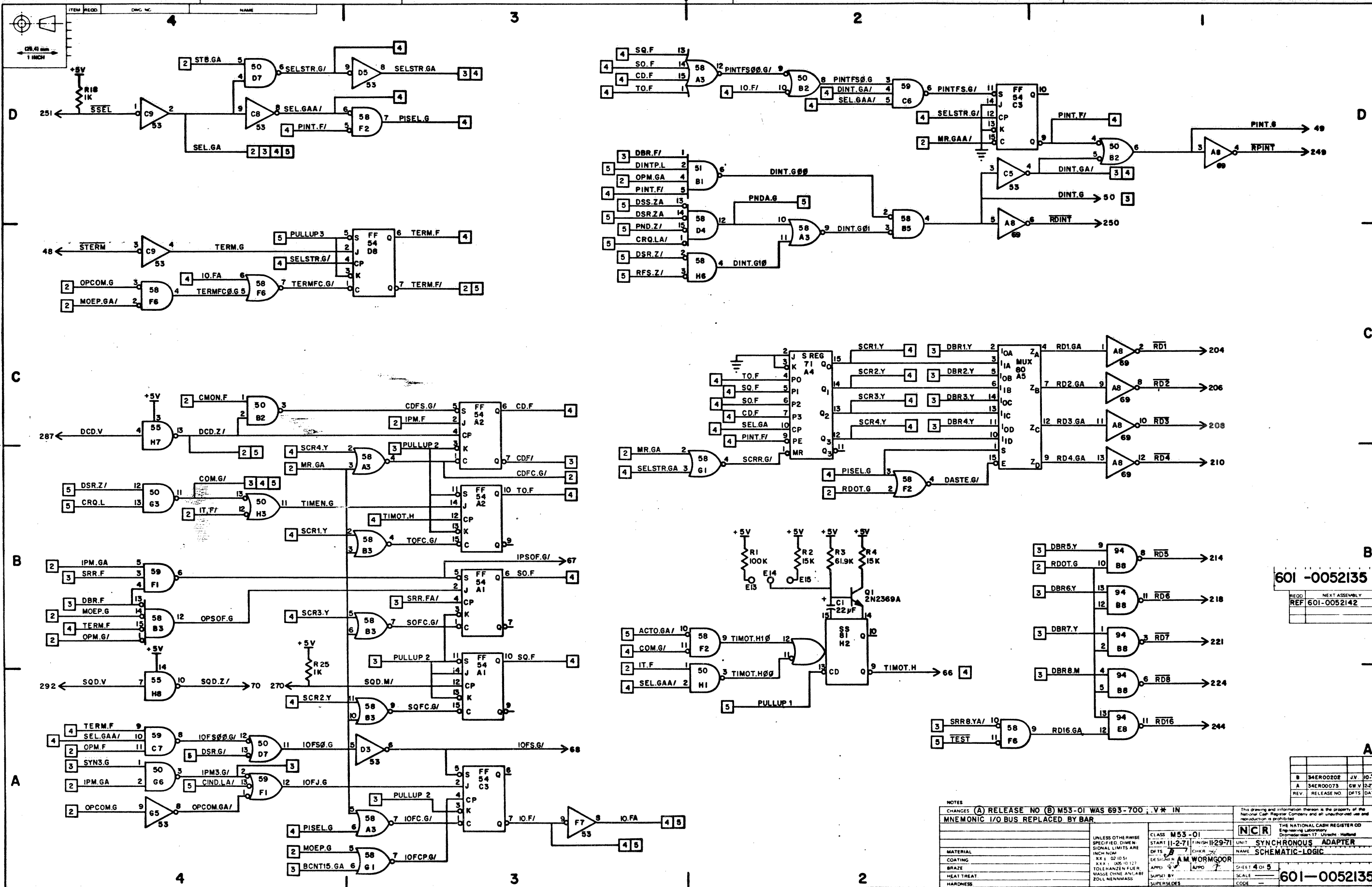
601-0052135

REF 601-0052142

NOTES
 CHANGES (A) RELEASE NO (B) M53-01 WAS 693-700 V* IN
 MNEMONIC I/O BUS REPLACED BY BAR

MATERIAL	UNLESS OTHERWISE SPECIFIED, ALL MATERIALS SHALL BE AS SUPPLIED BY THE MANUFACTURER.	CLASS M53-01	DATE 11-3-71	BY 11-29-71
COATING				
BRAZE				
HEAT TREAT				
HARDNESS				

NCR THE NATIONAL CASH REGISTER CO
 Synchronous Adapter
 SCHEMATIC-LOGIC
 3 5
 601-0052135



601-0052135

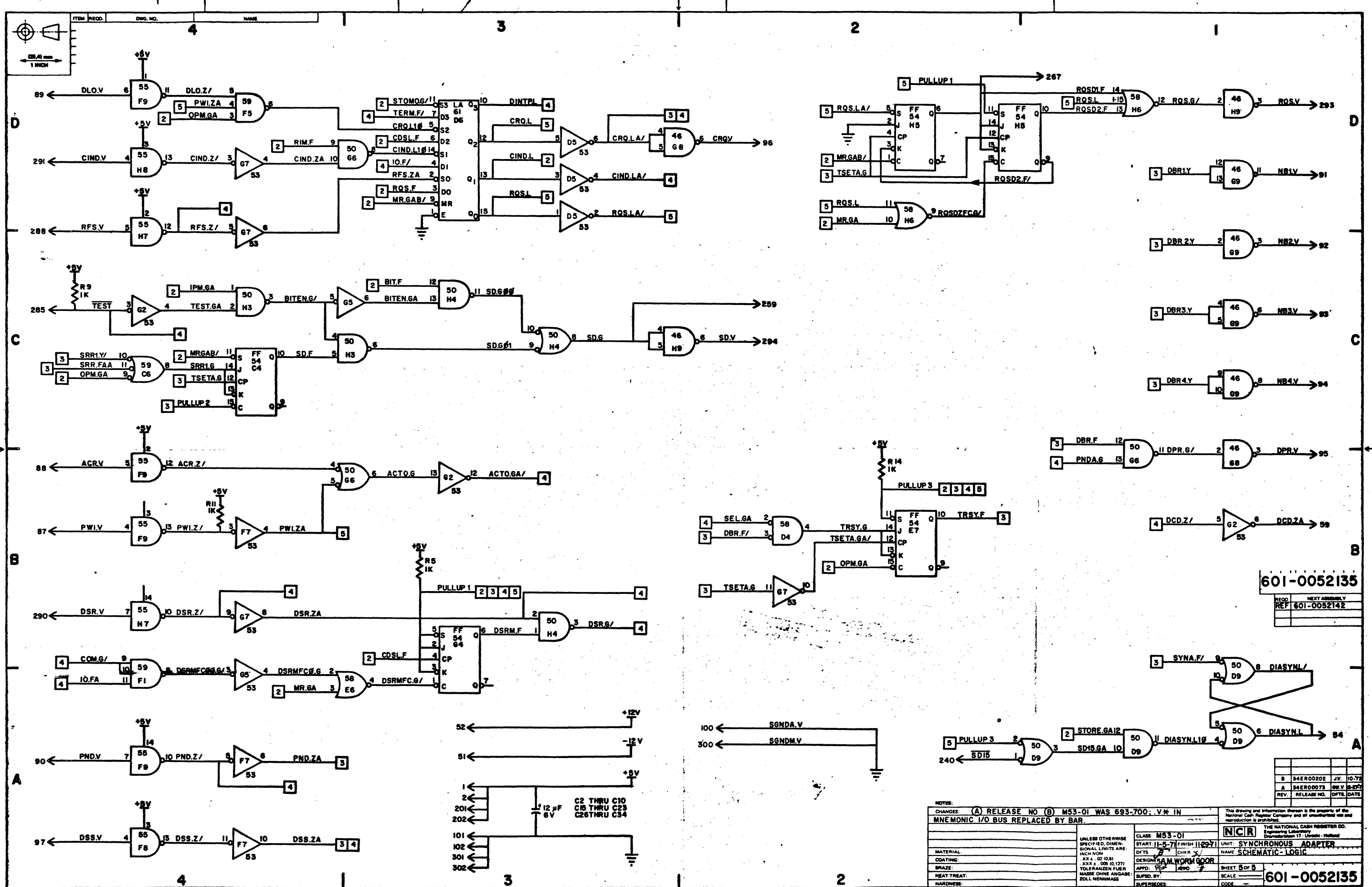
RECD	NEXT ASSEMBLY
REF 601-0052142	

NOTES

CHANGES (A) RELEASE NO (B) M53-01 WAS 693-700 ; V * IN
 MNEMONIC I/O BUS REPLACED BY BAR

MATERIAL	UNLESS OTHERWISE SPECIFIED DIMEN. SIGNAL LIMITS ARE INCH NOM	CLASS M53-01	START 11-27-71	FINISH 11-29-71	UNIT SYNCHRONOUS ADAPTER
COATING	XX 1 02 05 1	DESIGNER A.M. WORMGOOR	APPRO	DATE	NAME SCHEMATIC-LOGIC
BRAZE	XX 1 02 10 127	APPRO	DATE	SCALE	SHEET 4 OF 5
HEAT TREAT	MADE CHINE ANV-LAB	SUPD BY	DATE	SCALE	601-0052135
HARDNESS	ZOLL MENNEMASS	SUPERSEDES			

THE NATIONAL CASH REGISTER CO
 Engineering Laboratory
 Drummerstown 17, Utrecht, Holland



601-0052135

REQD	NEXT ASSEMBLY
REF 601-0052142	

NOTES:

CHANGES (A) RELEASE NO (B) M53-01 WAS 693-700; V.H. IN MNEMONIC I/O BUS REPLACED BY BAR.

MATERIAL:	UNLESS OTHERWISE SPECIFIED, DIMENSIONAL LIMITS ARE: INCH NOM	CLASS M53-01	THE NATIONAL CASH REGISTER CO. Engineering Laboratory
COATING:	XXX ± .02 (0.5)	START 11-5-71	UNIT: SYNCHRONOUS ADAPTER
BRAZE:	XXX ± .05 (0.127)	FINISH 11-29-71	NAME SCHEMATIC-LOGIC
HEAT TREAT:	TOLERANZEN-FUER MASSE OHNE ANGABE: ZOLL NEHMMASS	DESIGNER A.M. WORM GOOR	SCALE
HARDWARE:		APPD: 4/80	SHEET 5 OF 5
		SUPD. BY:	601-0052135
		SUPERSEDES:	CODE

SHEET :	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
SIZE :	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
REVISION :	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	B	B															B	B			B	B					
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	D	D															D										

CHANGES : (A) Release No.
 (B) Correction of timing and text
 (C) Change to module number on all sheets (D) On
 Sheet 18 corrected signal MOEP; on Sheet 37 RSET was TSET.

D	34ER00443	Rev	1/14/72
C	34RE00202	Rev	2/14/72
B	34ER00128	I.T	4/72
A	34ER00098	I.T	2/14/72
REV.	RELEASE NO.	DFTS.	DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.

COVER SHEET	CLASS: M53-01	NCR THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedaansloot 17 - Utrecht - Holland
	START: 10-1-72	
	FINISH: 10-1-72	UNIT: SYNCHRONOUS ADAPTER
	DFTS: I.W. CNKR: AMW	NAME: BLOCK AND FLOW
	DESIGNER: A.M. Wormgoor	DESCRIPTION
	APPD: [Signature] APPD: [Signature]	SHEET 1 OF 42
SUPSD. BY:	601-0052222	
SUPERSEDES:	CODE: -	

SHEET :	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42												
SIZE :	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												
REVISION :	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A												
											B		B														
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C												
											D																

CHANGES : (A) Release No.
 (B) Correction of timing and text
 (C) Change to module numbers on all sheets (D) On
 Sheet 18 corrected signal MOEP; on Sheet 37 RSET was TSET.

D	34ER00443	Rev	1/14/72
C	34ER00202	Rev	2/14/72
B	34ER00128	I.T	4/72
A	34ER00098	I.T	2/14/72
REV.	RELEASE NO.	DFTS.	DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.

COVER SHEET	CLASS: M53-01	NCR THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedaansloot 17 - Utrecht - Holland
	START: 10-1-72	
	FINISH: 10-1-72	UNIT: SYNCHRONOUS ADAPTER
	DFTS: I.W. CNKR: AMW	NAME: BLOCK AND FLOW
	DESIGNER: A.M. Wormgoor	DESCRIPTION
	APPD: [Signature] APPD: [Signature]	SHEET 2 OF 42
SUPSD. BY:	601-0052222	
SUPERSEDES:	CODE: -	

TABLE OF CONTENTS

		<u>Page</u>
1.0	<u>SCOPE</u>	5
2.0	<u>INTRODUCTION</u>	5
3.0	<u>FEATURES</u>	6
4.0	<u>BLOCK DIAGRAM</u>	7
5.0	<u>GLOSSARY</u>	8
6.0	<u>TIMING DIAGRAM</u>	13
6.1	Output (and Reply) Mode	13
6.2	Output Mode termination	14
6.3	Output and Reply Mode termination	15
6.4	Input Mode-synchronization	16
6.5	Input Mode - Mark detection	17
6.6	Ring Indicator Monitor Mode	18
6.7	Automatic calling	19
6.8	Time - out status (0001)	20
	6.8.1 From Interaltimer	20
	6.8.2 From Automatic Calling	20
6.9	System Overload status (0100)	21
	6.9.1 On output	21
	6.9.2 On input	22
6.10	Carrier Drop Status (1000)	23
	6.10.1 With monitor	23
	6.10.2 Automatic detection	23
6.11	Request to Send delay	24
6.12	New Sync.	24
6.13	Diagnostic Sync. Pulse	25
	6.13.1 On output	25
	6.13.2 On input	25

TABLE OF CONTENTS (CONT'D)

		<u>Page</u>
7.0	<u>BLOCK FLOW</u>	26
7.1	Introduction	26
7.2	Set, Sample I/O command execution	27
7.3	Modes	28
7.4	Conditions	29
7.5	Program interrupt service	30
7.6	Automatic answering	31
7.7	Automatic dialing	32
7.8	Automatic data transfer	33
7.9	Character transfer (output-input)	34
7.10	Output (and Reply) Mode - Data handling	35
7.11	Output (and Reply) Mode termination	36
7.12	Input Mode	37
7.13	New Sync - Input Mode resync.	38
7.14	Carrier Drop Monitor and automatic detection	39
7.15	Interval-timer	40
7.16	Data Set Ready Monitor	41
7.17	Request to Send - Ready for Sending	42

ORIGINATOR		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC. NO. 501-0052222	REV C
ENGINEER		NCR ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET 3	OF 42

ORIGINATOR	DATE	TITLE	M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC. NO. 501-0052222	REV C
ENGINEER	DATE	APPROVAL	DATE	NCR ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET 4	OF 42

1.0 SCOPE

Along with the logic schematics, this document is to be used for trouble shooting and maintaining the **M53-1-STD** Synchronous Adapter.

2.0 INTRODUCTION

The **M53-1-STD** is a Synchronous Communication Unit, capable of 2- or 4-wire two-way alternate operation on a multi-point or point-to-point, switched or non-switched link.

It accomodates only 8-level ASCII or EBCDIC transmission codes.

The transmission speed (with a maximum of 20.000 bps) is determined by the modem, because timing signals are derived from the modem.

The adapter basically operates in five modes:

1. Idle mode
2. Ring indicator mode
3. Input mode
4. Output mode
5. Output and Reply mode

The adapter enters one flow when the appropriate command has been received from the **M05** GPMC. After a successful "handshake" with the modem, the adapter, if output, will request a character from the **M05** in the form of data interrupt.

The character is then stored in the adapter's data buffer. With the trailing edge of the transmitter clock the data character is shifted serially to the adapter's send-receive register, and transmitted to the modem.

2.0 INTRODUCTION (Cont'd)

When the adapter is in the input mode and leading SYN-characters have been received it will assemble a data character by counting 8 successive incoming data bits. The character is then shifted to the data buffer and a program interrupt will then be raised by the adapter, requesting for service.

Status codes are sampled after each program interrupt depicting the reason for interrupt.

Mode termination is accomplished either in the form of receiving a function code specifying a different mode, or automatically.

Receiving a different mode from the **M05** will result in an immediate abort of the current mode.

Automatic mode termination occurs either in the Output and Reply mode, where the adapter switches to Input mode after transmission of the last character, or in the Ring Indicator mode where the adapter switches to Idle mode when it detects ringing current from the line.

The **M53-1-STD** is designed as a first level communication element to the **M05**. Additional communication elements can be added as second-level peripherals to the **M05** via the addition of a scanner. This scanner occupies the first level port slot on the **M05**, and provides the scanning capability and the sub-bussing of the **M05** interface lines to the second-level units.


The **M53-1-STD** adapter provides the data communications equipment interface according to RS232C and CCITT V.24


3.0 FEATURES

The **M53-1-STD** adapter is equipped with an Automatic Dialing feature.

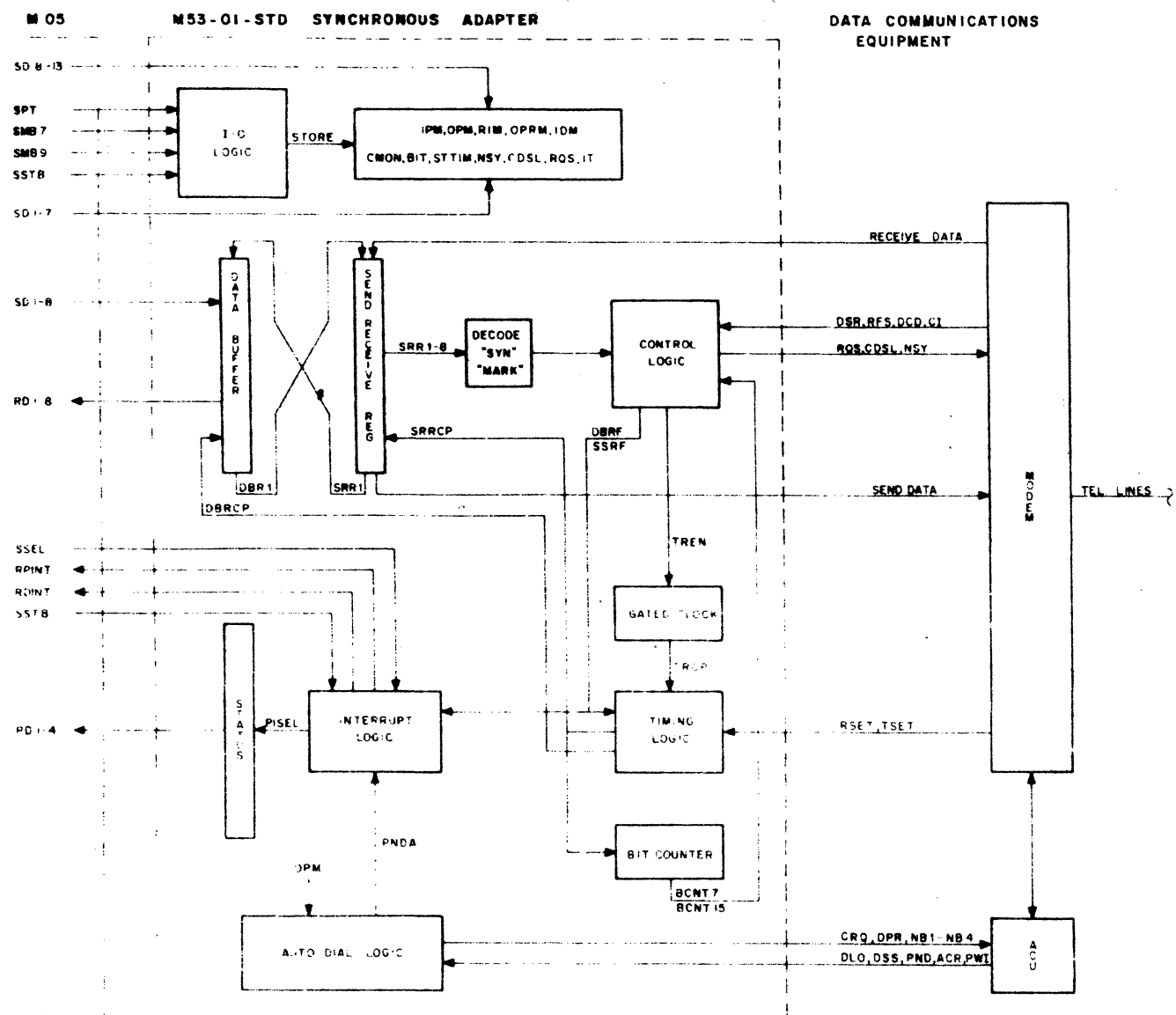
This feature enables the **M05** to, under program control, automatically initiate and establish line connections on a switched network.

Bell 801 Automatic Calling Unit is required.

M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC. NO. 601-0052222	REV C
 ENGINEERING LABORATORY <small>ROMMERSDIJKVAAN 17 E.G. BOX 3024 UTRECHT HOLLAND</small>		SHEET 5	OF 42

ORIGINATOR	DATE	TITLE M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC. NO. 601-0052222	REV C
ENGINEER	DATE	APPROVAL 	ENGINEERING LABORATORY <small>ROMMERSDIJKVAAN 17 E.G. BOX 3024 UTRECHT HOLLAND</small>	SHEET 6 OF 42

4.0 BLOCK DIAGRAM



5.0 GLOSSARY

- ACR Abandon call and retry. From auto calling unit. Indicates A.C.U. time-out and starts interval timer.
- BCNT7 Bitcount 7. Trailing edge resets data buffer flag after transfer of an output-character to the send-receive register.
- BCNT15 Bitcount 15. Trailing edge sets data buffer flag after transfer of an input-character to the data buffer.
- BIT.F Bit flag. Used during selftest to store a pseudo bitsequence simulating incoming data.
- CD.F Carrier drop flag. This status bit is set when modem drops its carrier detector lead.
- CDSL.F Connect data set to line flag. Condition bit to control connect D.S. to line to the modem.
- CIND.L Calling indicator latch. Set when ringing current is detected during automatic answering.
- CMON.F Carrier monitor flag. Condition bit to detect loss of incoming carrier.
- COM Call originating mode. Indicates dialing period starting when CRQ is turned ON and ending when DSR is turned ON.
- CRQ Call request. Initiates the A.C.U. to start dialing.
- DBR 1-8 Data buffer. Parallel outputs.
- DBR.F Data buffer flag. Set when data buffer contains a character.
- DCD Data carrier detector. From modem.

M53-1-STD SYNCHRONOUS ADAPTER
BLOCK AND FLOW DESCRIPTION

SPEC. NO. 601-0052222 C

NCR

7 OF 42

ORIGINATOR	DATE	TITLE	SPEC. NO.
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222 C
ENGINEER	DATE	APPROVAL	DATE
		NCR	
ENGINEERING LABORATORY ELECTRONIC RESEARCH AND DEVELOPMENT UTRECHT, HOLLAND			SHEET 8 OF 42

5.0 GLOSSARY (Cont'd)

DIASYN.L Diagnostic synchronization latch. Set with function code, reset when SYNA.F is turned on.

DINT Data interupt. Turns on RDINT and RPINT as a request for service.

DINTP.L Data interrupt permit latch. Turned off by terminate flag to prevent further data interrupts.

DPR **Digit present.** Turned on by the adapter when a requested dial digit is presented to the A.C.U.

DSR Data set ready. From modem.

DSRM.F Data set ready monitor **flag.** Turned on by CDSL condition bit to detect **ON** condition of data set ready signal.

DSS Data set status. From A.C.U.

IO.F I/O interrupt flag. Causes program interrupt without status bits turned on.

IPM.F Input mode flag.

IT.F Interval timer flag. Condition bit to control the integrated interval timer.

MARK True when send-receive register contains only one-bits.

MOEP Mode entry pulse, Triggered when the adapter changes its mode. Used to initialize the control logic.

NSY New sync. To modem. New sync. one-shot is triggered when NSY condition bit is turned on.

5.0 GLOSSARY (Cont'd)

OPCOM Output complete. Used to automatically switch from output and reply mode to input mode after completion of output.

OPM.F Output mode flag.

OPRM.F Output and reply mode flag

PINT.F Program interrupt flag. Turns on RPINT as a request for service.

RD Received data. From modem.

RDOT Read out. Gates input data character onto the datalines to **M05** during sampling.

PND Present next digit. From A.C.U. to request a dial-digit.

PWI Power indicator. A.C.U. - Power on.

RIM.F Ring indicator monitor flag. Monitors for ON-condition of calling indicator.

RQS.F Request to send flag. Condition bit to control request to send to the modem.

RQS.L Request to send latch. Prevents RQS to the modem going ON when RFS from the modem is not OFF.

RQSD1.F Request to send delay **flip-flops.** Two stage counter, used to delay turning OFF RQS to the modem.

RQSD2.F

RSET Receiver signal element timing. From modem. Used to input data.

SCR1-4 **Status-code register.** Storage of status code during program interrupt service.

SD.F Send data flip-flop. Storage of bit currently presented to the modem.

ORIGINATOR	DATE	TITLE	SPEC. NO.	REV.
		M53-1-STD SYNCHRONOUS ADAPTER	601-0052222	C
		BLOCK AND FLOW DESCRIPTION		
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	9	42
<small>ENGINEERING LABORATORY PROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND</small>				

ORIGINATOR	DATE	TITLE	SPEC. NO.	REV.
		M53-1-STD SYNCHRONOUS ADAPTER	601-0052222	C
		BLOCK AND FLOW DESCRIPTION		
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	10	42
<small>ENGINEERING LABORATORY PROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND</small>				

5.0 GOSSARY (Cont'd)

SEL Select. Port select from **M05** in response to interrupt from the adapter.

SELSTR Select-strobe. Select during strobe time.

SMB9 Mode bit 9. Mode bit line from **M05** to adapter to indicate set or sample command.

SMB7 Mode bit 7. Used during set command to indicate the absence of a mode field in the function code.

SO.F System overload flag. This status bit is set when overload occurs during output or input.

SQ.F Signal quality flag. This status bit is set when modem indicates bad signal quality.

SRR1-8 Send receive register. Parallel outputs.

SRRCP Send-receive register clock pulse.

SRR.F Send-receive register flag. Set when S-R register contains data.

STB Strobe. Timing signal from **M05** for set and sample commands, or for interrupt service.

STOMO Store mode. Coincides with second strobe during set command when mode bit 7 is OFF. Used for mode storage.

STORE Store. Coincides with second strobe during set command. Used for storage of conditions.

STIM.F Selftest timing flag. Condition bit used during selftest mode to simulate modem timing signals.

5.0 GLOSSARY (Cont'd)

SYN Output of SYN-character decoder. Decoding of S-R register contents.

SYNA.F Synchronization sequence flip-flops. Used during character synchronization on input.

SYNB.F

SYN 0 Synchronization count 0. Decoded output of SYNA.F and SYNB.F turned OFF after receipt of first SYN-character.

SYN 3 Synchronization count 3. Decoded output of SYNA.F and SYNB.F turned ON after receipt of at least two successive SYN-characters followed by a non SYN-character.

TERM.F Terminate flag. Set during auto data transfer with delivery of last character.

TIMEN Timer enable. Allows time-out interrupt after expiration of the interval timer.

TIMOT.H Time-out. Output of interval timer.

TIMOT.H00 Input to interval timer. Active when the interval timer condition bit is set.

TIMOT.H10 Input to interval timer. Used during auto-dialing.

TO.F Time out flag. This status bit is set when time-out occurs.

TSET Transmitter signal element timing. From modem used to output data.

TRCP Transfer clockpulse. Output of gated oscillator used to transfer characters bitserially between data buffer and S-R register.

TREN Transfer enable. Controls TRCP oscillator.

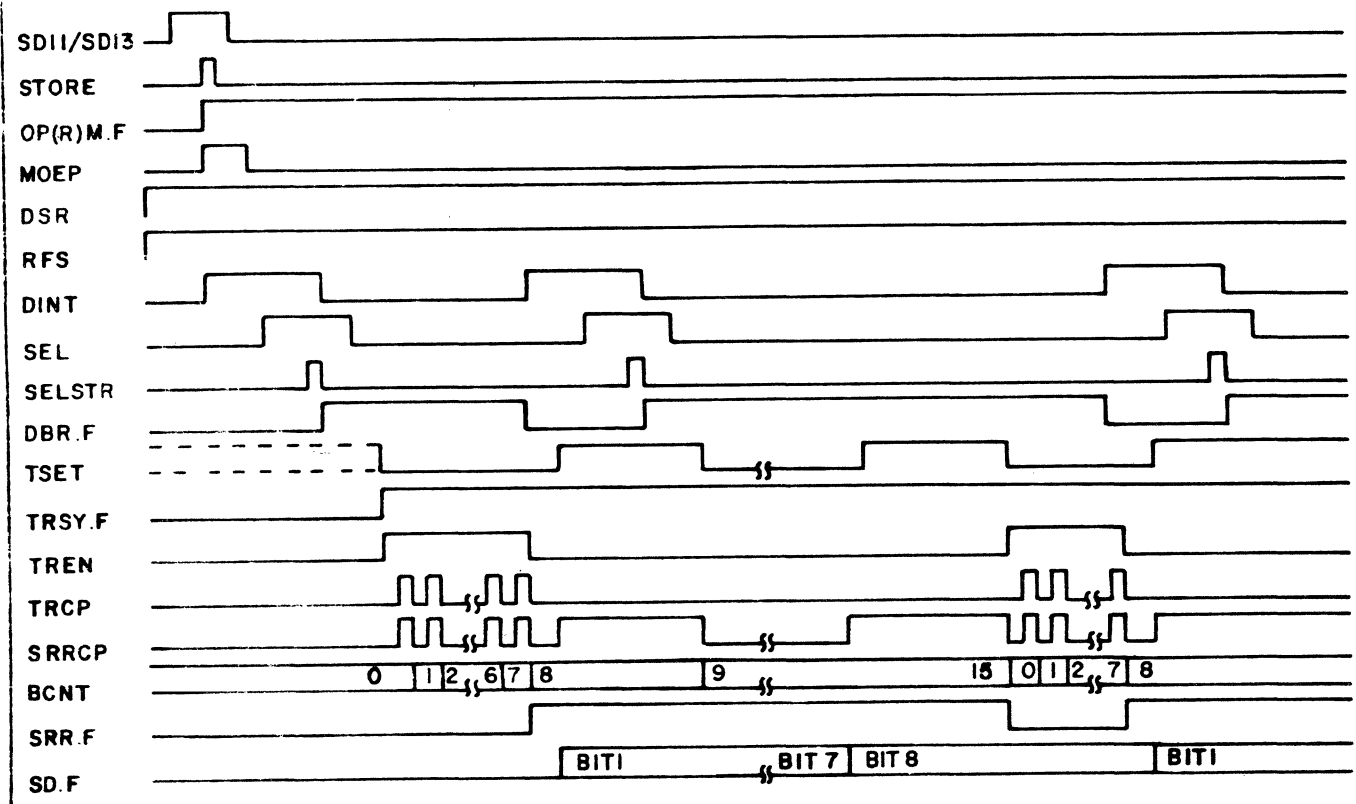
TRSY.F Transfer synchronization flag. Used on output to synchronize the transfer from data buffer to S-R register with TSET.

ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	11	42
ENGINEERING LABORATORY DR. MMEDARISLAAN 17, P. O. BOX 1024 UTRECHT, HOLLAND				

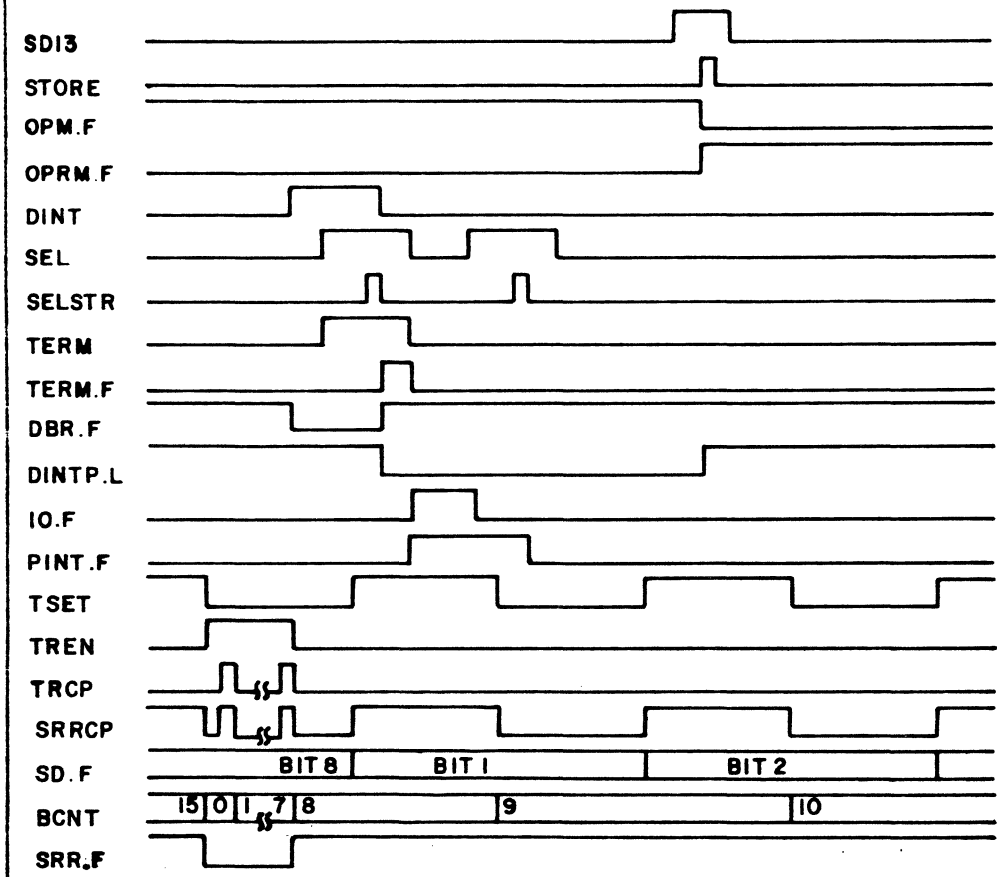
ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	12	42
ENGINEERING LABORATORY DR. MMEDARISLAAN 17, P. O. BOX 1024 UTRECHT, HOLLAND				

6.0 TIMING DIAGRAM

6.1 OUTPUT (AND REPLY) MODE



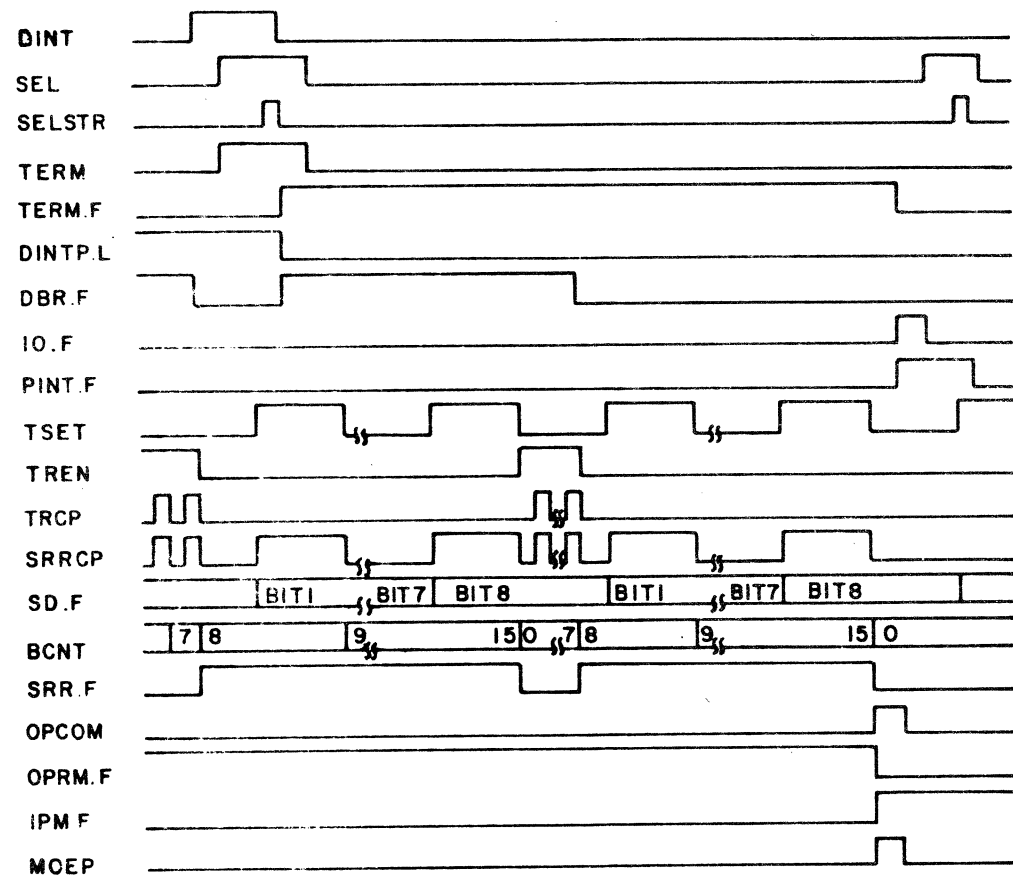
6.2 OUTPUTMODE TERMINATION



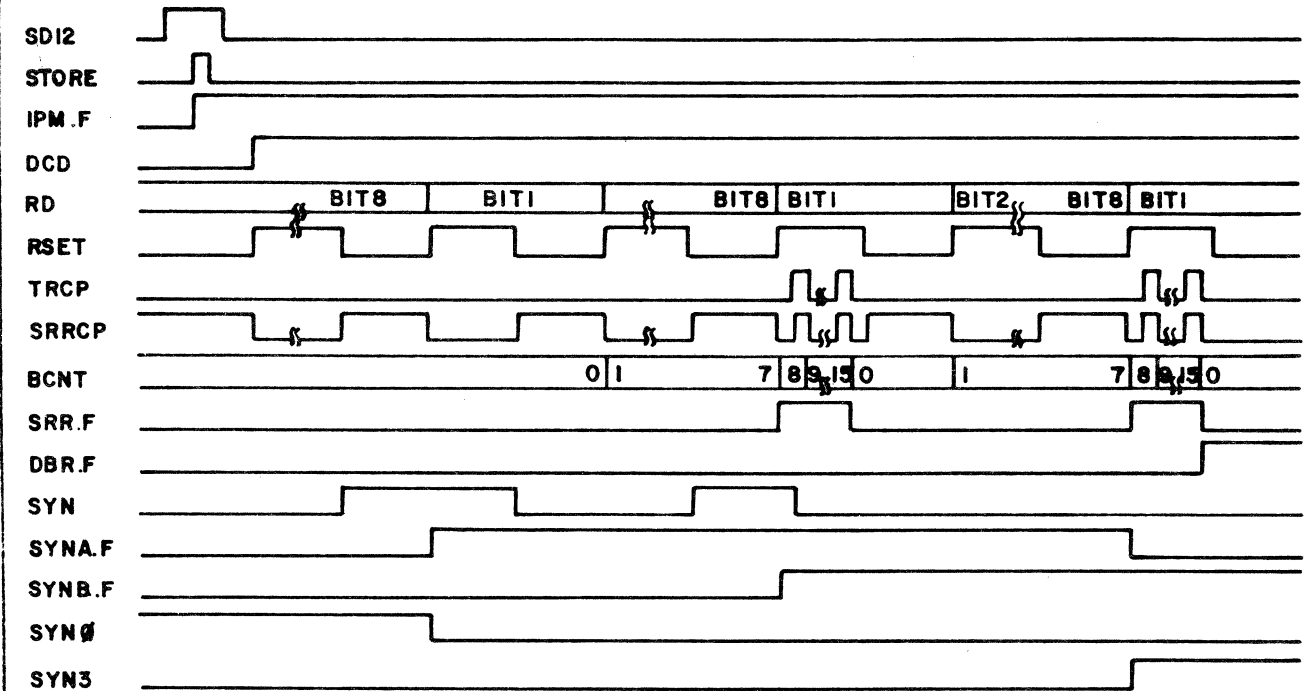
ORIGINATOR	DATE	TITLE	SPEC NO	REV
		M53-1-STD SYNCHRONOUS ADAPTER	601-0052222	c
		BLOCK AND FLOW DESCRIPTION		
ENGINEER	DATE	APPROVAL	DATE	SHEET OF
		NCR		13 42
ENGINEERING LABORATORY DROMMEDARISBLAAN 12, P.O. BOX 3024 UTRECHT, HOLLAND				

ORIGINATOR	DATE	TITLE	SPEC NO	REV
		M53-1-STD SYNCHRONOUS ADAPTER	601-0052222	c
		BLOCK AND FLOW DESCRIPTION		
ENGINEER	DATE	APPROVAL	DATE	SHEET OF
		NCR		14 42
ENGINEERING LABORATORY DROMMEDARISBLAAN 12, P.O. BOX 3024 UTRECHT, HOLLAND				

6.3 OUTPUT AND REPLY MODE TERMINATION



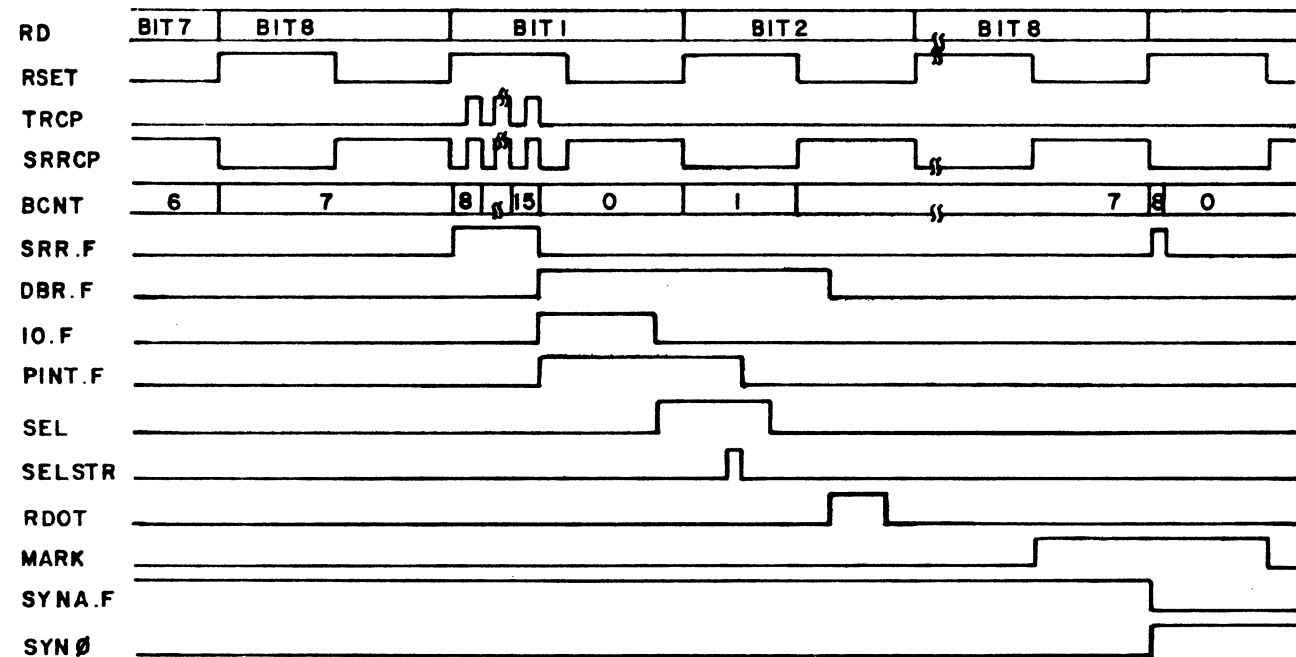
6.4 INPUT MODE - SYNCHRONIZATION



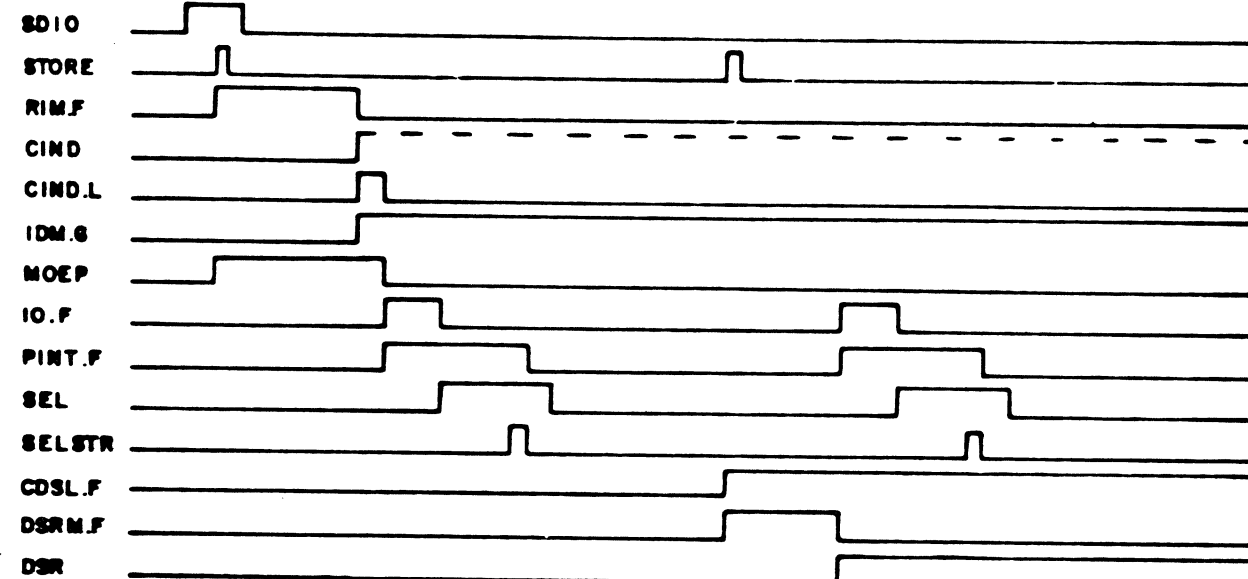
ORIGINATOR	DATE	TITLE M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO. 601-0052222	REV C
ENGINEER	DATE	NCR ENGINEERING LABORATORY DROMMEDARISLAAN 17 P.O. BOX 3024 UTRECHT HOLLAND	SHEET OF 15 42	

ORIGINATOR	DATE	TITLE M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO. 601-0052222	REV C
ENGINEER	DATE	APPROVAL NCR ENGINEERING LABORATORY DROMMEDARISLAAN 17 P.O. BOX 3024 UTRECHT HOLLAND	SHEET OF 16 42	

6.5 INPUT MODE - MARK DETECTION



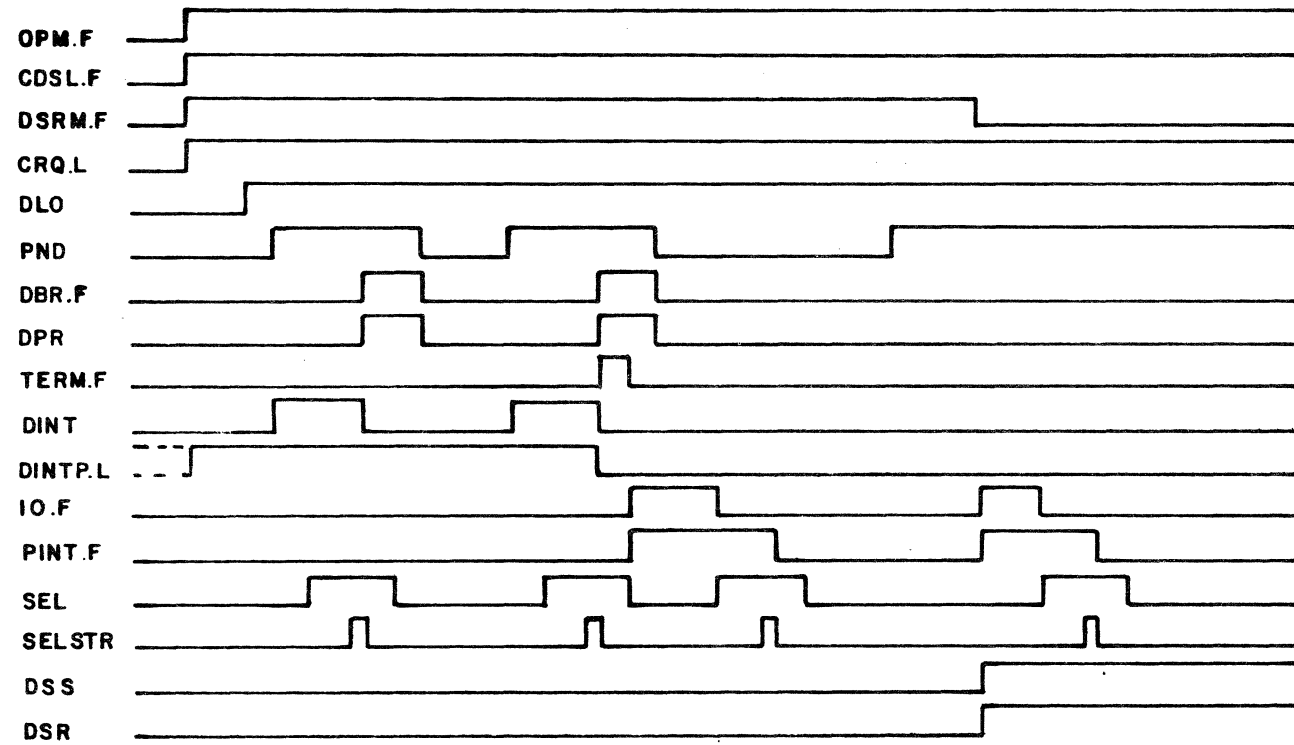
6.6 RING INDICATOR MONITOR MODE



ORIGINATOR	DATE	TITLE	M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO.	601-0052222	REV	C
ENGINEER	DATE	APPROVAL	DATE	NCR	ENGINEERING LABORATORY DROMMEDARIJSLAAN 17, P.O. BOX 1024 UTRECHT HOLLAND	SHEET	17 OF 42

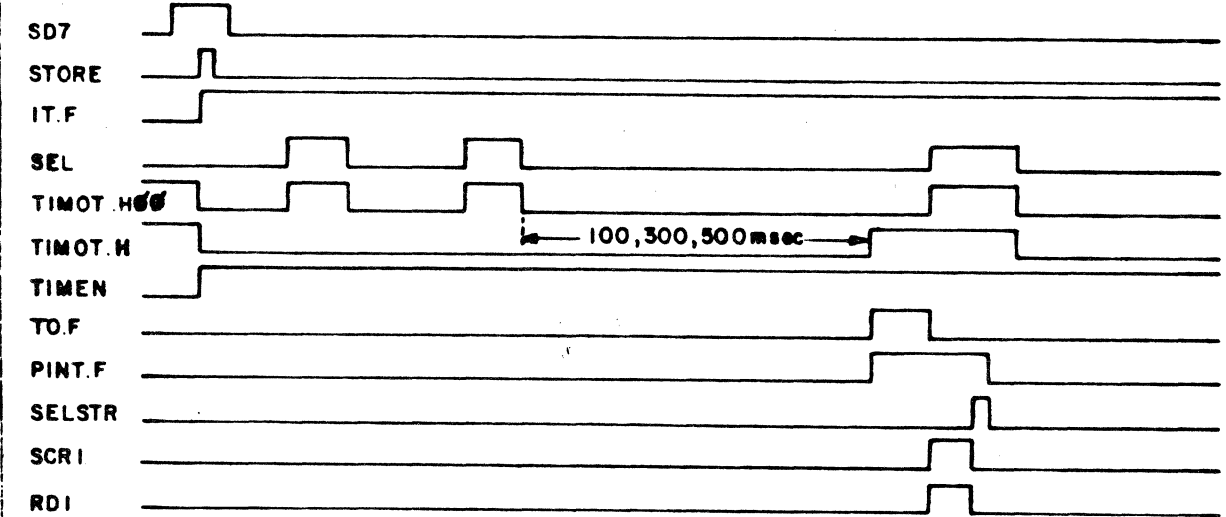
ORIGINATOR	DATE	TITLE	M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO.	601-0052222	REV	D
ENGINEER	DATE	APPROVAL	DATE	NCR	ENGINEERING LABORATORY DROMMEDARIJSLAAN 17, P.O. BOX 1024 UTRECHT HOLLAND	SHEET	18 OF 42

6.7 AUTOMATIC CALLING



6.8 TIME OUT STATUS (0001)

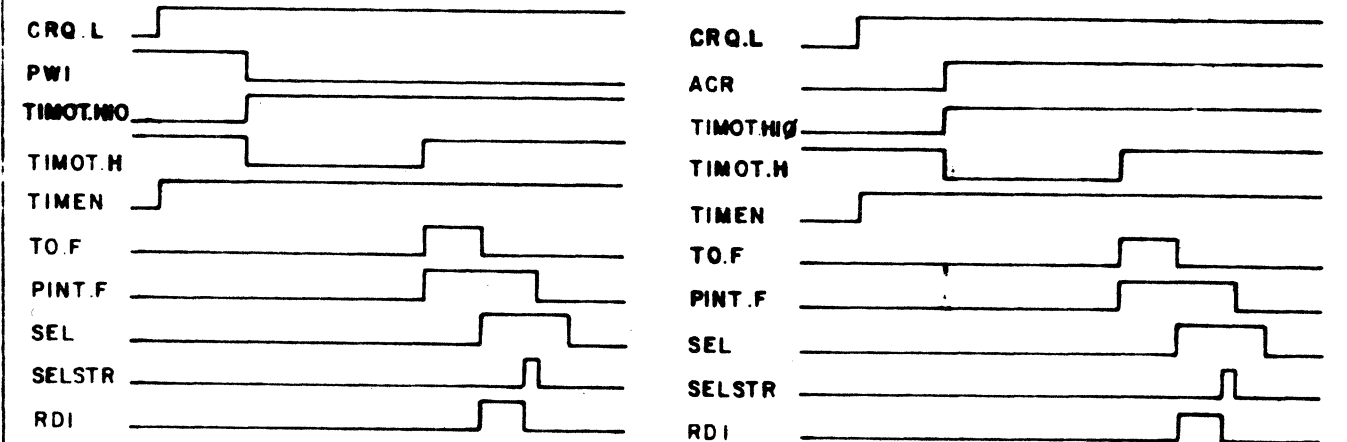
6.8.1 FROM INTERVAL TIMER



6.8.2 DURING AUTO CALLING

POWER FAILURE

A.C.R. TIME-OUT

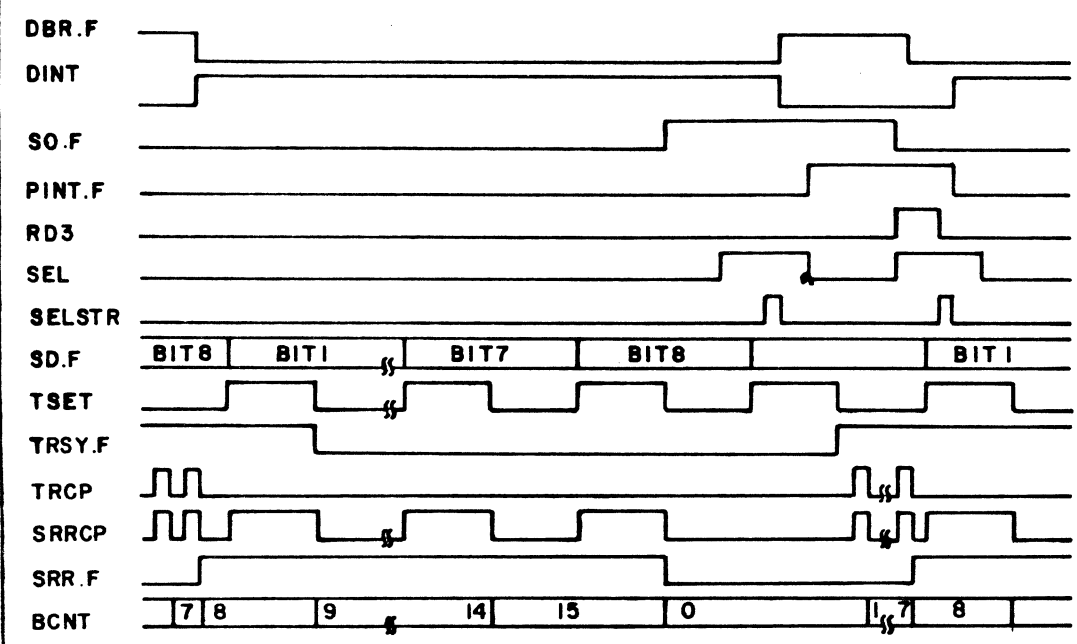


ORIGINATOR	DATE	TITLE	SPEC NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	19	42
ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 1024 UTRECHT HOLLAND				

ORIGINATOR	DATE	TITLE	SPEC NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	20	42
ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 1024 UTRECHT HOLLAND				

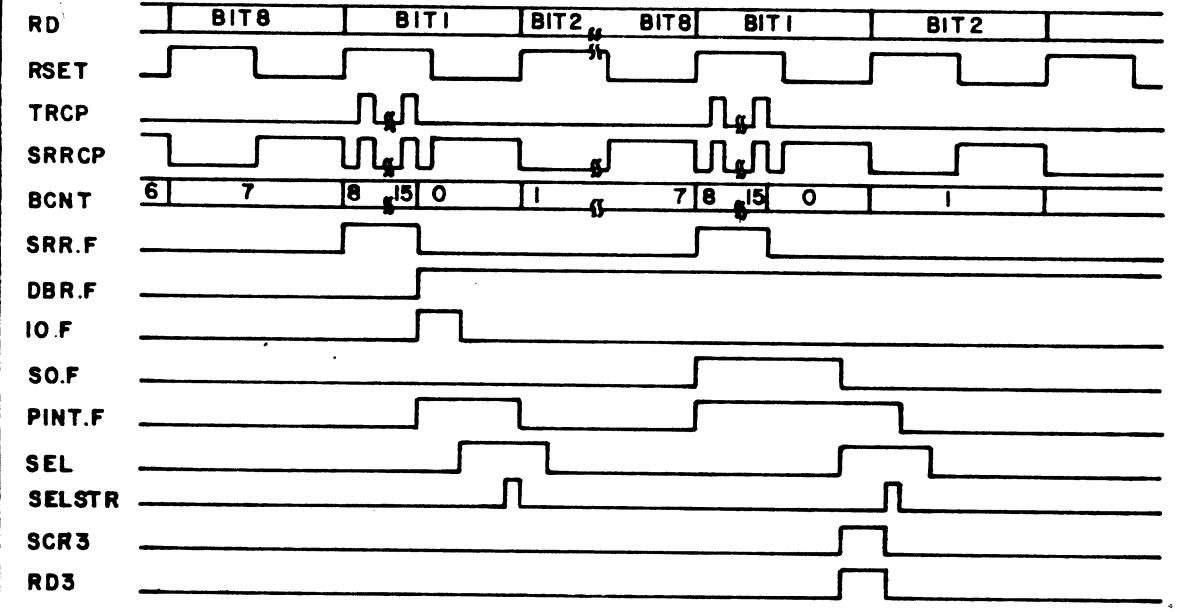
6.9 SYSTEM OVERLOAD STATUS (0100)

6.9.1 ON OUTPUT



6.9 SYSTEM OVERLOAD STATUS CONT.D

6.9.2 ON INPUT

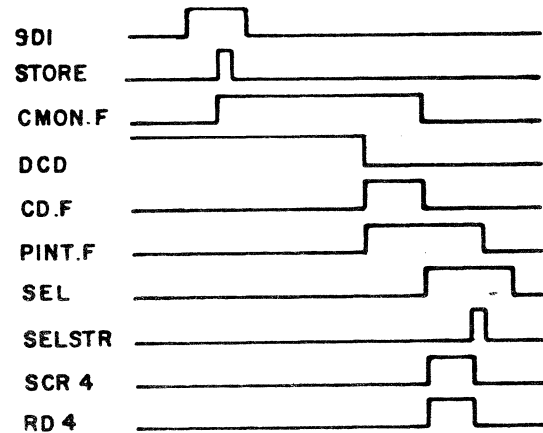


ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET OF	
		NCR ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	21 OF 42	

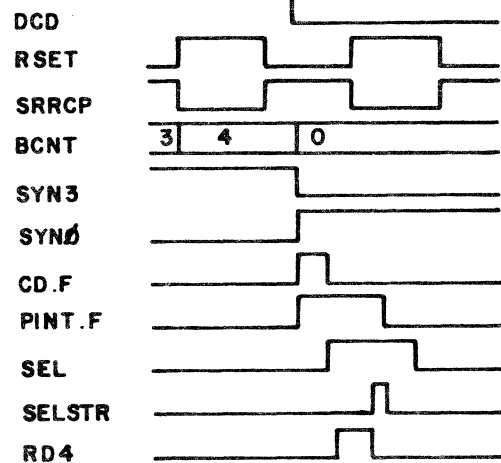
ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET OF	
		NCR ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	22 OF 42	

6.10 CARRIER DROP STATUS (1000)

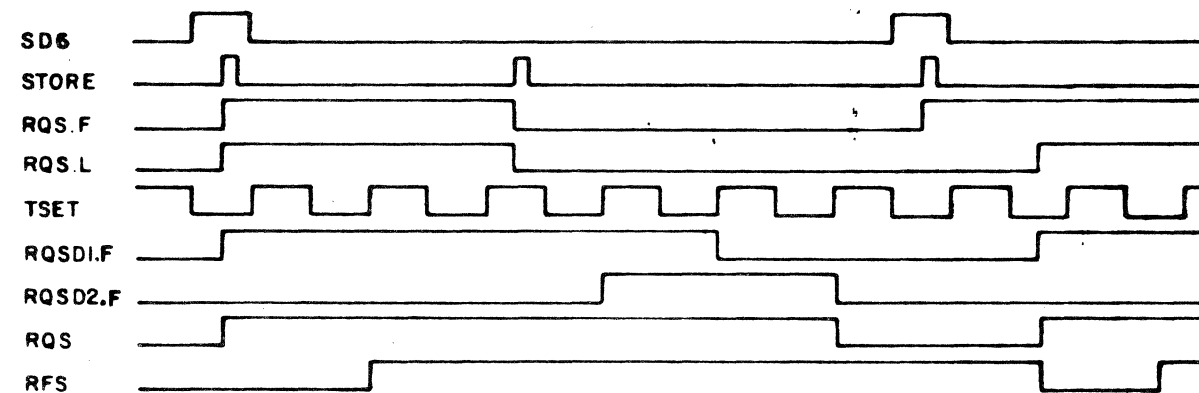
6.10.1 WITH MONITOR



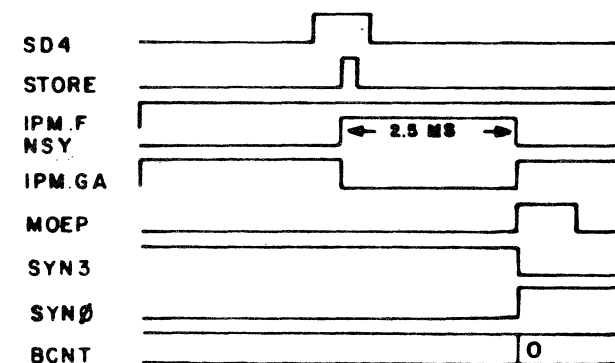
6.10.2 AUTOMATIC DETECTION



6.11 REQUEST TO SEND DELAY



6.12 NEW SYNC



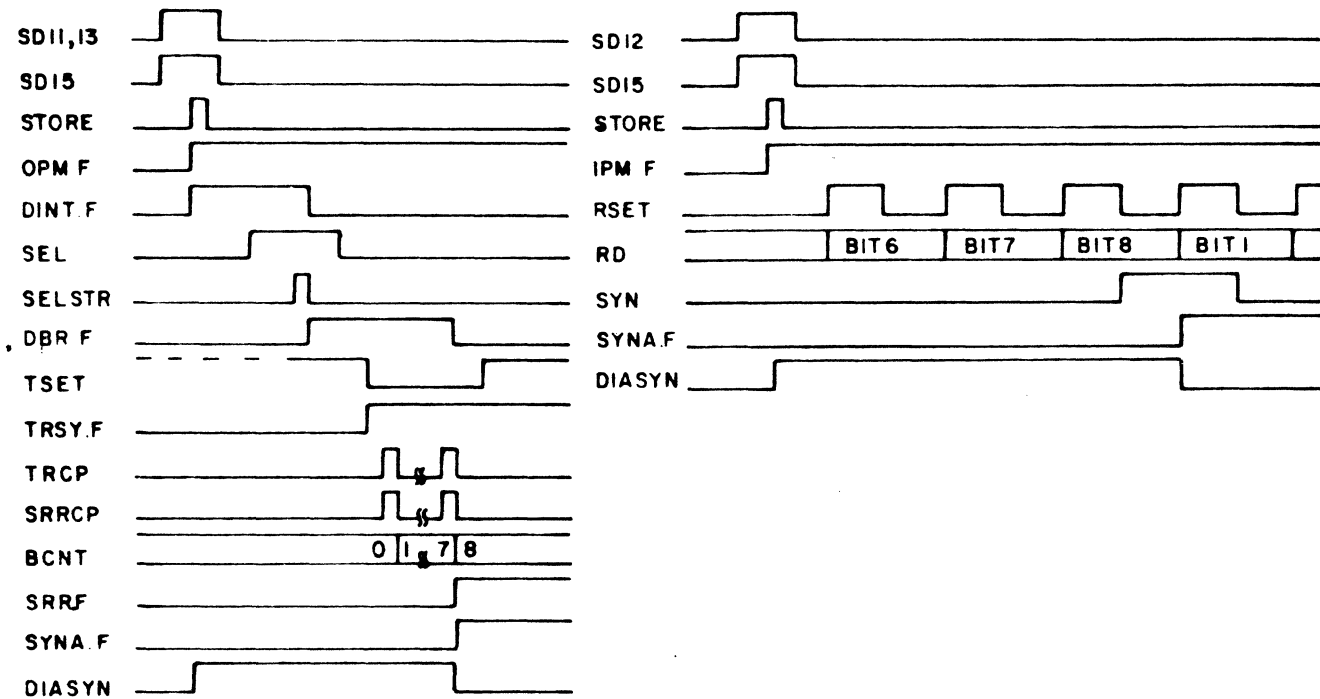
ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	23	42
ENGINEERING LABORATORY DROMMEDARISBLAAN 17, P.O. BOX 3024 UTRECHT HOLLAND				

ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	24	42

6.13 DIAGNOSTIC SYNC PULSE (ON OUTPUT)

6.13.1 ON OUTPUT

6.13.2 ON INPUT



7.0 BLOCKFLOW

7.1 Introduction

To show the hardware operations that occur simultaneously a separate flow for each of these parallel activities has been prepared.

When one flow indicates a certain action, another flow may start or select another path. In the covering text reference is made to other active flows.

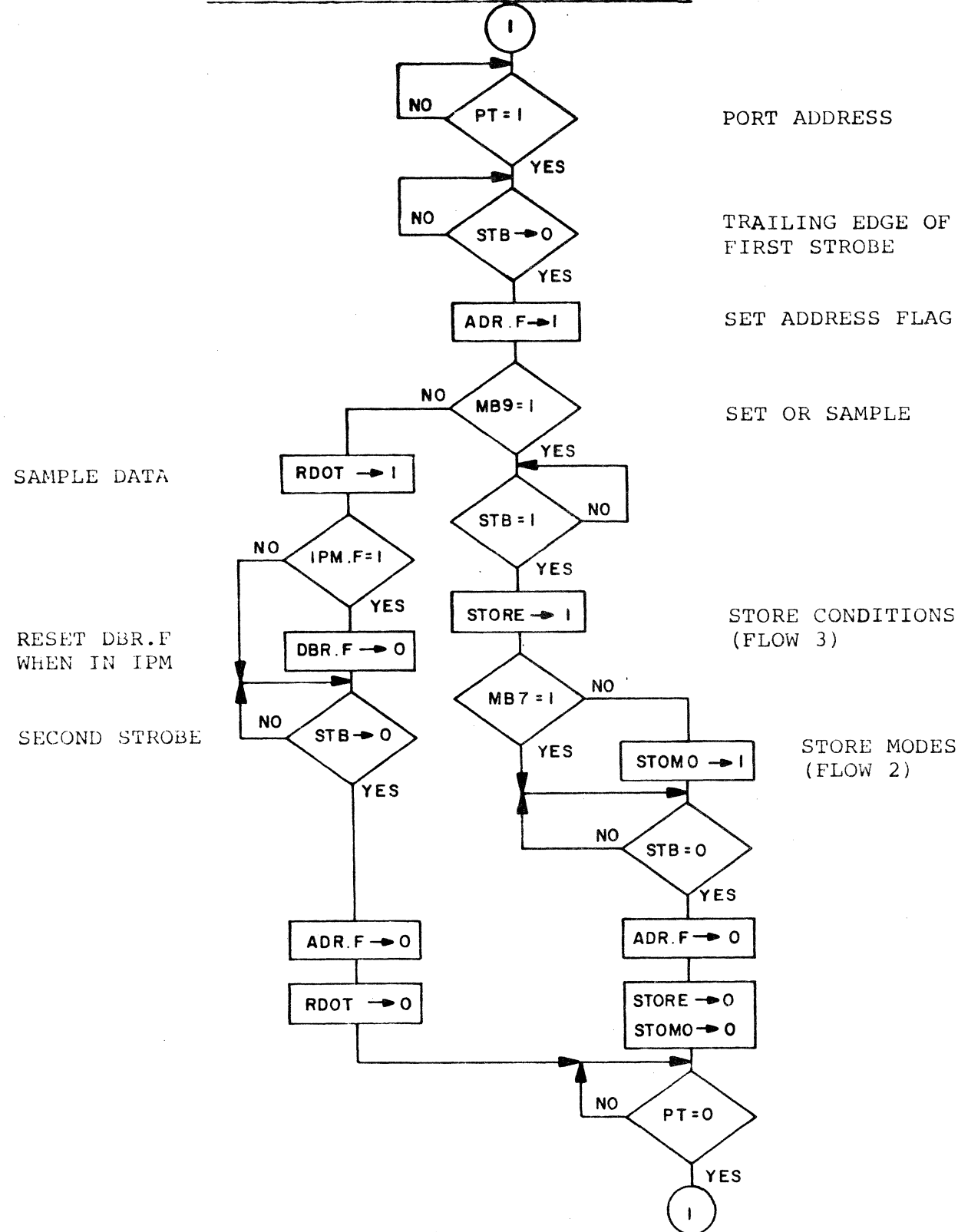
In the decision-diamonds an "=" sign indicates a level whereas an "→" sign indicates a transition. (particularly used in the case of clocked operation).

ORIGINATOR		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC NO 601-0052222	REV C
ENGINEER		APPROVAL	DATE	SHEET 25 OF 42	
		NCR		ENGINEERING LABORATORY CROMMEDIARISLAAN 17, P.O. BOX 1024 UTRECHT, HOLLAND	

ORIGINATOR		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC NO 601-0052222	REV C
ENGINEER		APPROVAL	DATE	SHEET 26 OF 42	
		NCR		ENGINEERING LABORATORY CROMMEDIARISLAAN 17, P.O. BOX 1024 UTRECHT, HOLLAND	

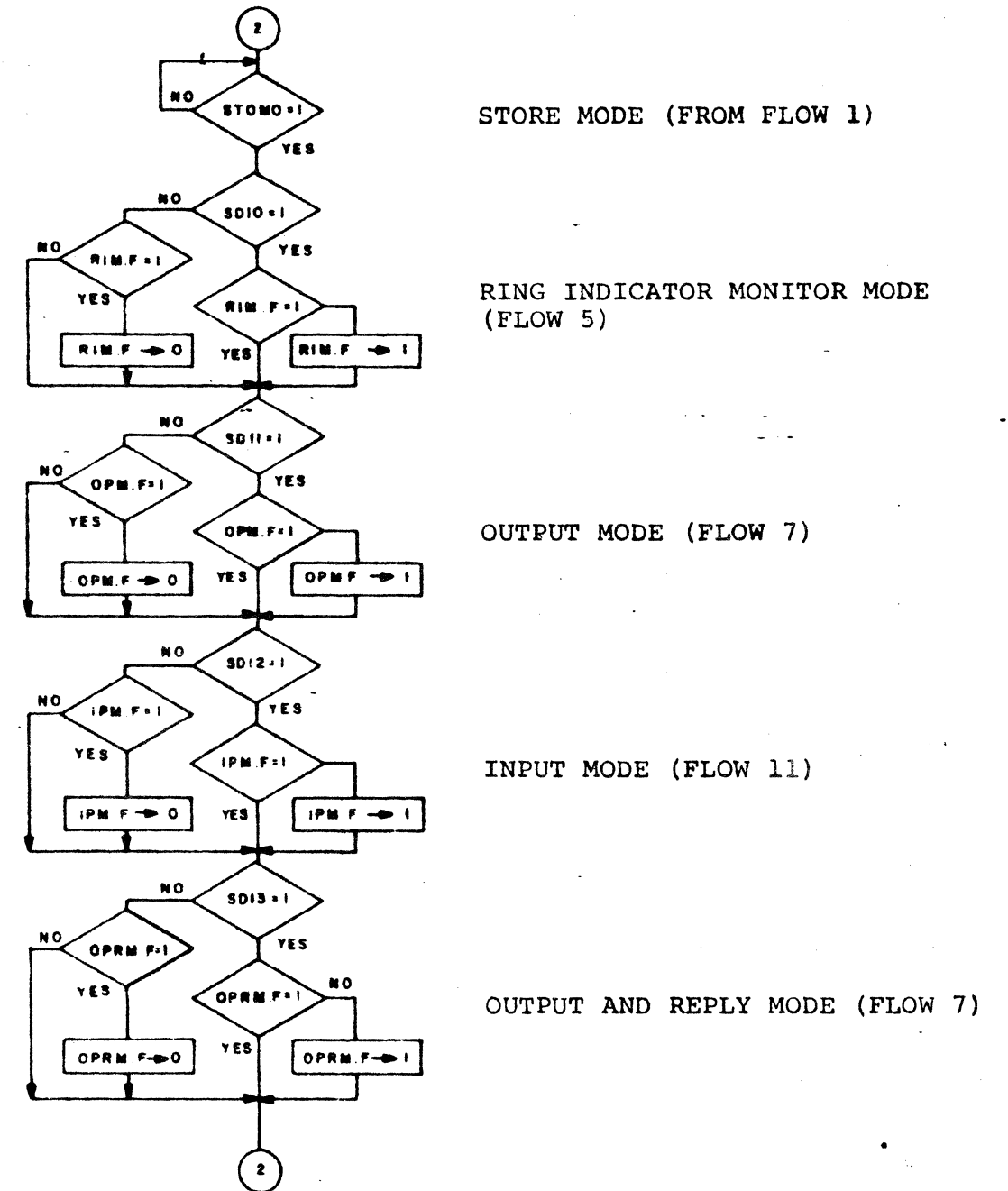
7.2

SET, SAMPLE I/O COMMAND EXECUTION



7.3

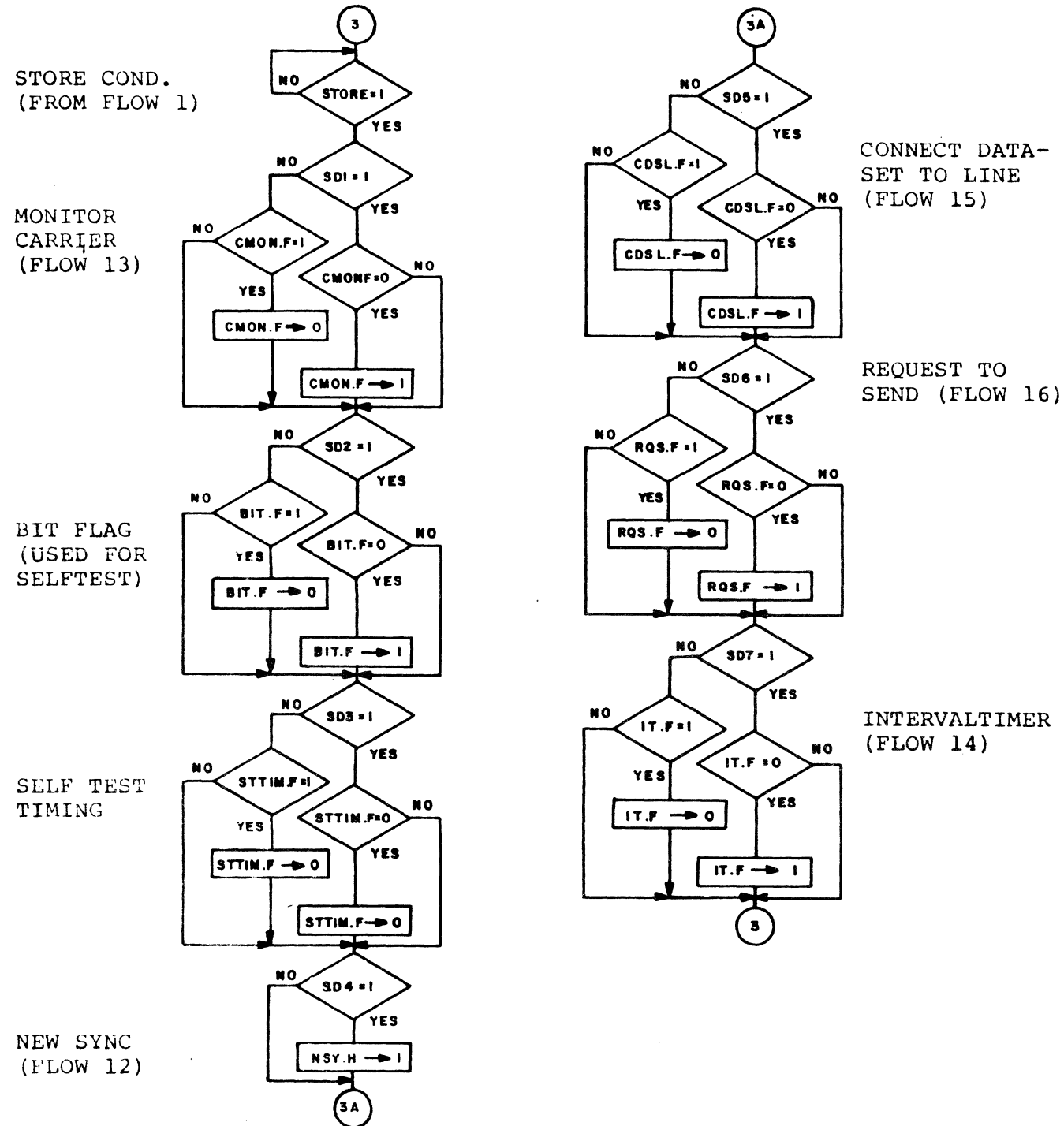
MODES



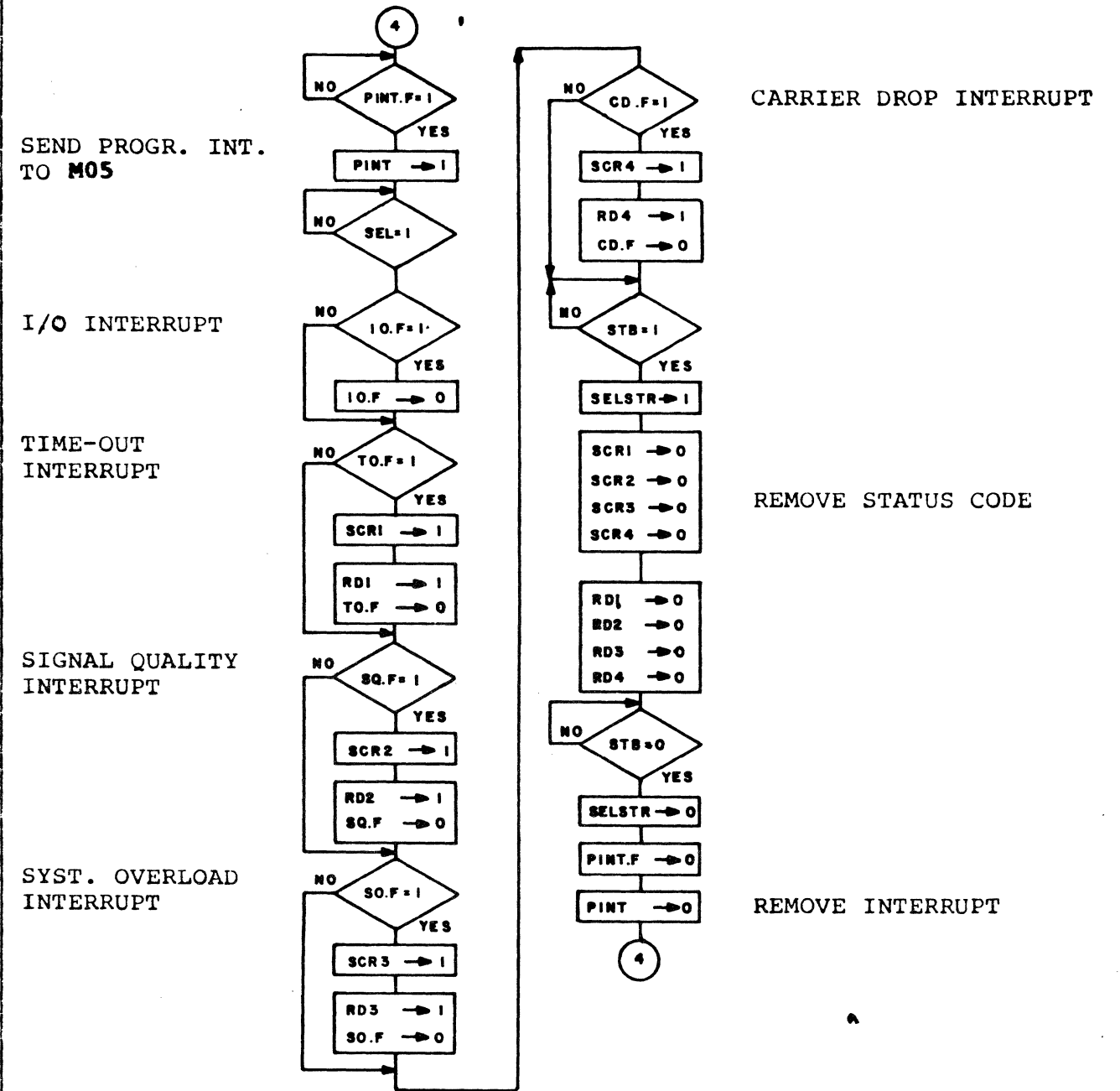
ORIGINATOR	DATE	TITLE	M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO	601-0052222	REV	C
ENGINEER	DATE	APPROVAL	DATE	NCR	ENGINEERING LABORATORY P.O. BOX 3004 STRECHT, HOLLAND	SHEET	27 OF 42

ORIGINATOR	DATE	TITLE	M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO	601-0052222	REV	C
ENGINEER	DATE	APPROVAL	DATE	NCR	ENGINEERING LABORATORY P.O. BOX 3004 STRECHT, HOLLAND	SHEET	28 OF 42

7.4 CONDITIONS



7.5 PROGRAM INTERRUPT SERVICE

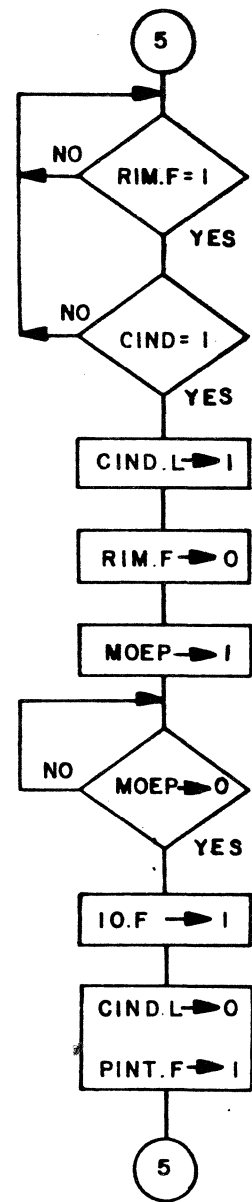


ORIGINATOR	DATE	TITLE	SPEC NO	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	29	42
		ENGINEERING LABORATORY DHOMMEDARISLAAN 17 P.O. BOX 3024 UTRECHT, HOLLAND		

ORIGINATOR	DATE	TITLE	SPEC NO	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	30	42
		ENGINEERING LABORATORY DHOMMEDARISLAAN 17 P.O. BOX 3024 UTRECHT, HOLLAND		

7.6

AUTOMATIC ANSWERING



WHEN CALLING INDICATOR ON

SET CALLING IND. LATCH

SWITCH TO IDLE MODE

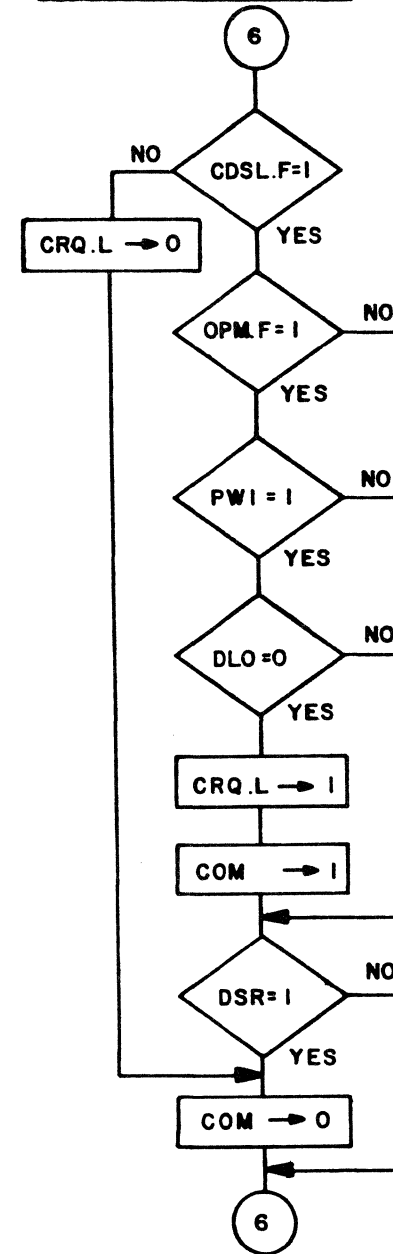
GENERATE MODE ENTRY PULSE

TRAILING EDGE GENERATES
I/O INTERRUPT

(FLOW 4)

7.7

AUTOMATIC DIALING



CONNECT DATA SET TO LINE (FLOW 15)

WHEN CDSL OFF-RESET CALL REQUEST
LATCH TO DISCONNECT.

A.C.U. - POWER ON

DATA LINE NOT OCCUPIED

SET CALL REQUEST LATCH

START DIALING (FLOW 7)

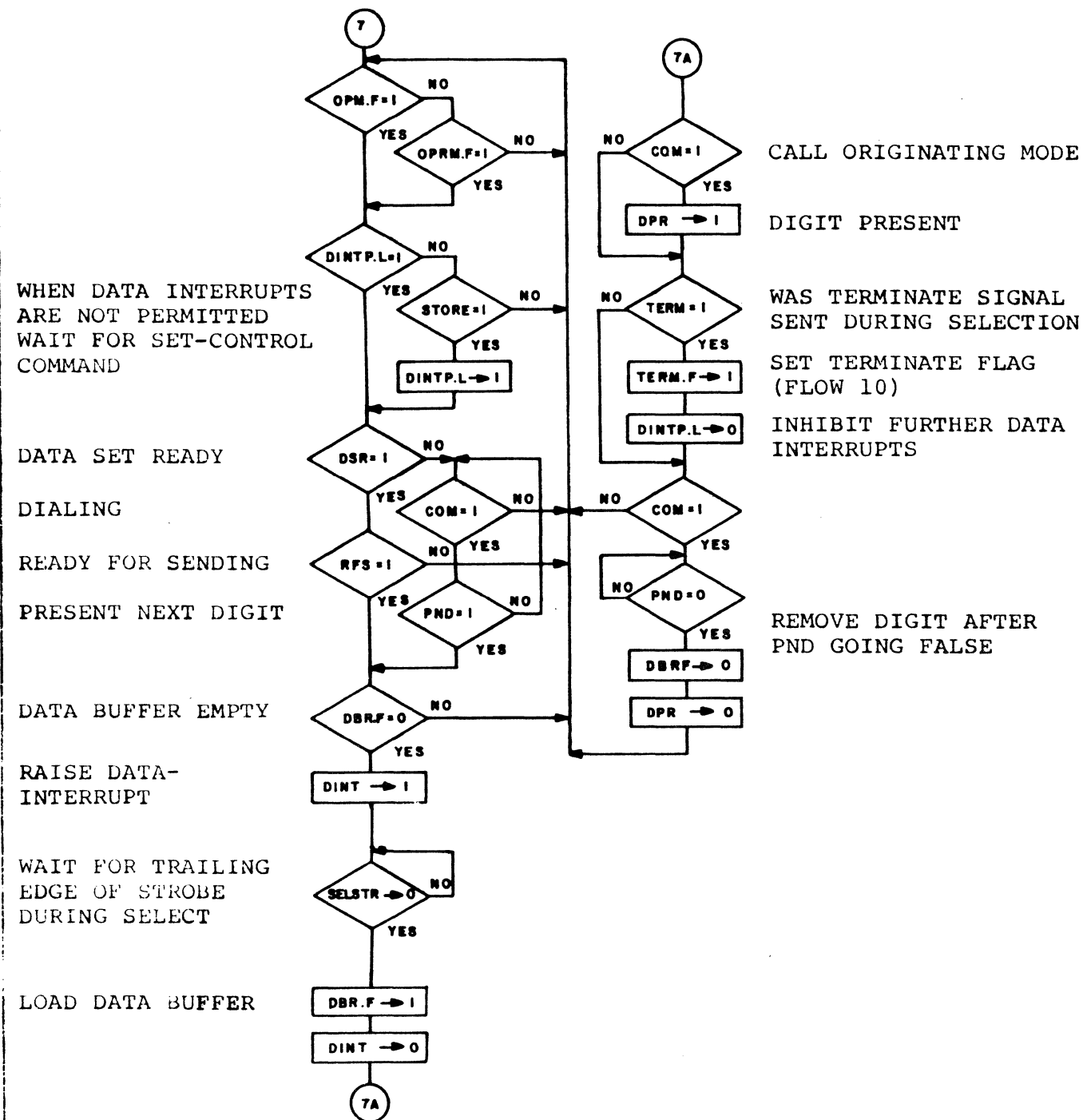
(FLOW 15)

TERMINATE DIALING

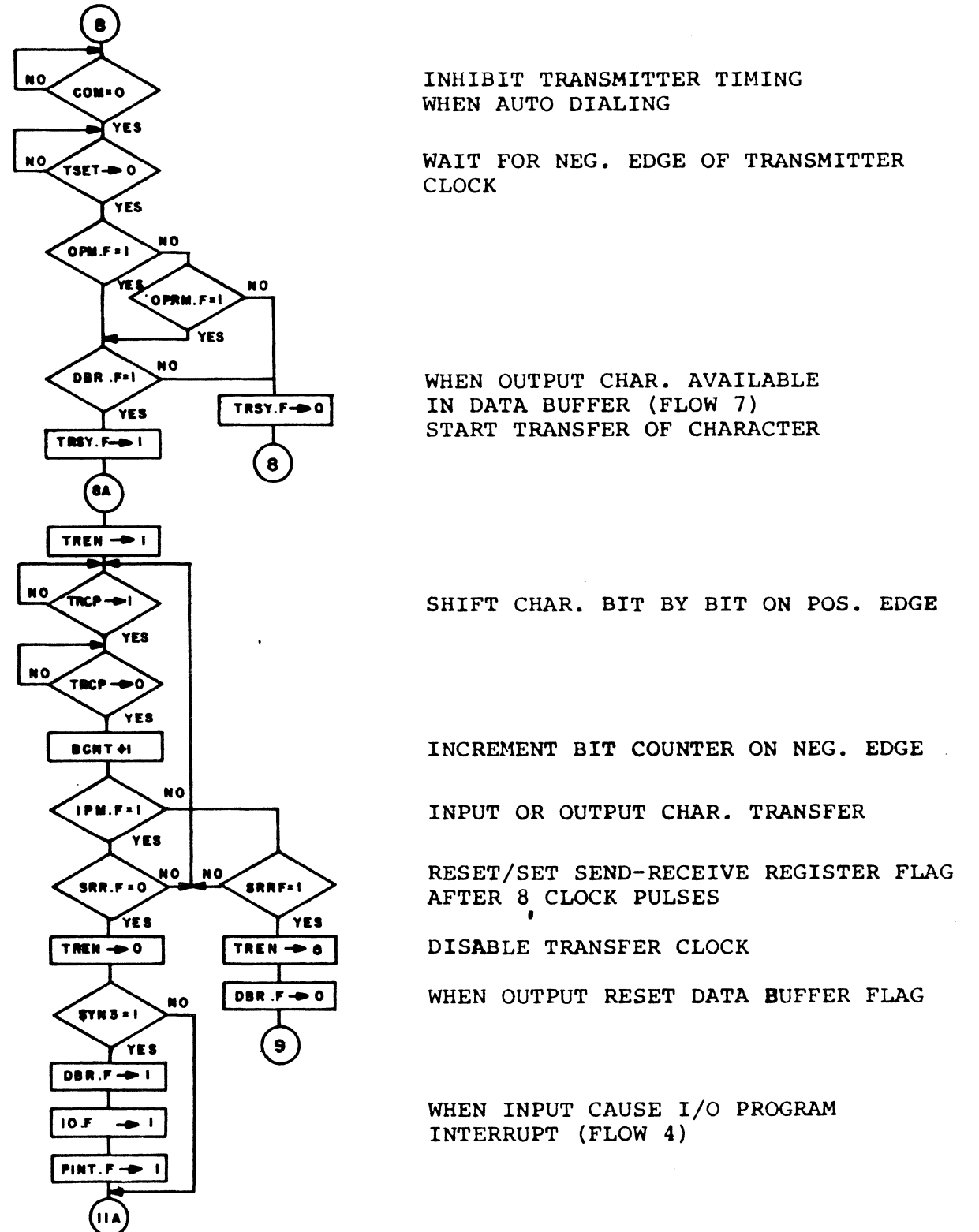
M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC. NO 601-0052222	REV C
DATE	NCR	ENGINEERING LABORATORY P.O. BOX 3024 UTRECHT, HOLLAND	SHEET 31 OF 42

ORIGINATOR	DATE	TITLE M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC. NO 601-0052222	REV C
ENGINEER	DATE	APPROVAL NCR	ENGINEERING LABORATORY P.O. BOX 3024 UTRECHT, HOLLAND	SHEET 32 OF 42

7.8 AUTOMATIC DATA TRANSFER (DIAL DIGITS OR OUTPUT DATA)



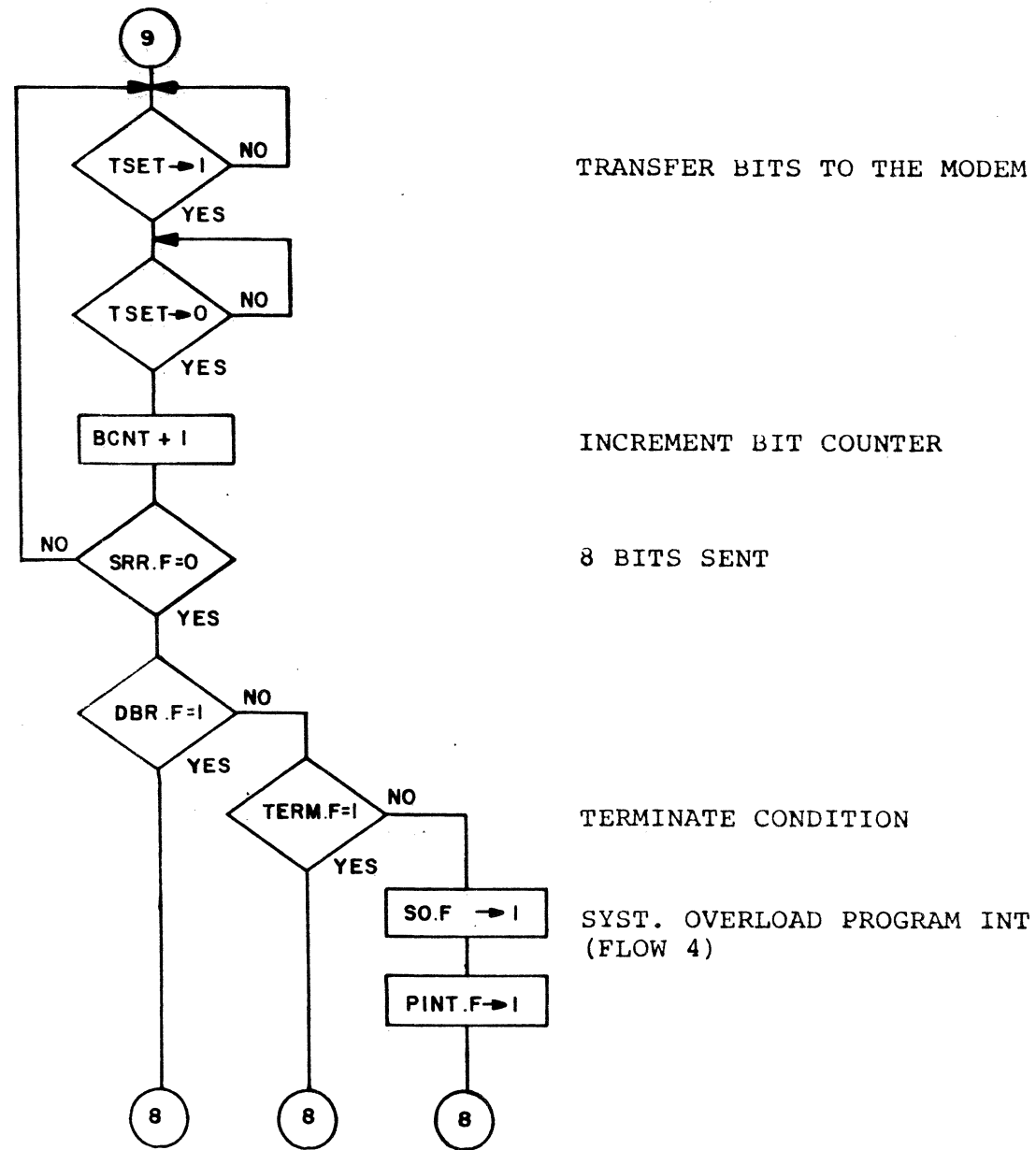
7.9 CHARACTER TRANSFER



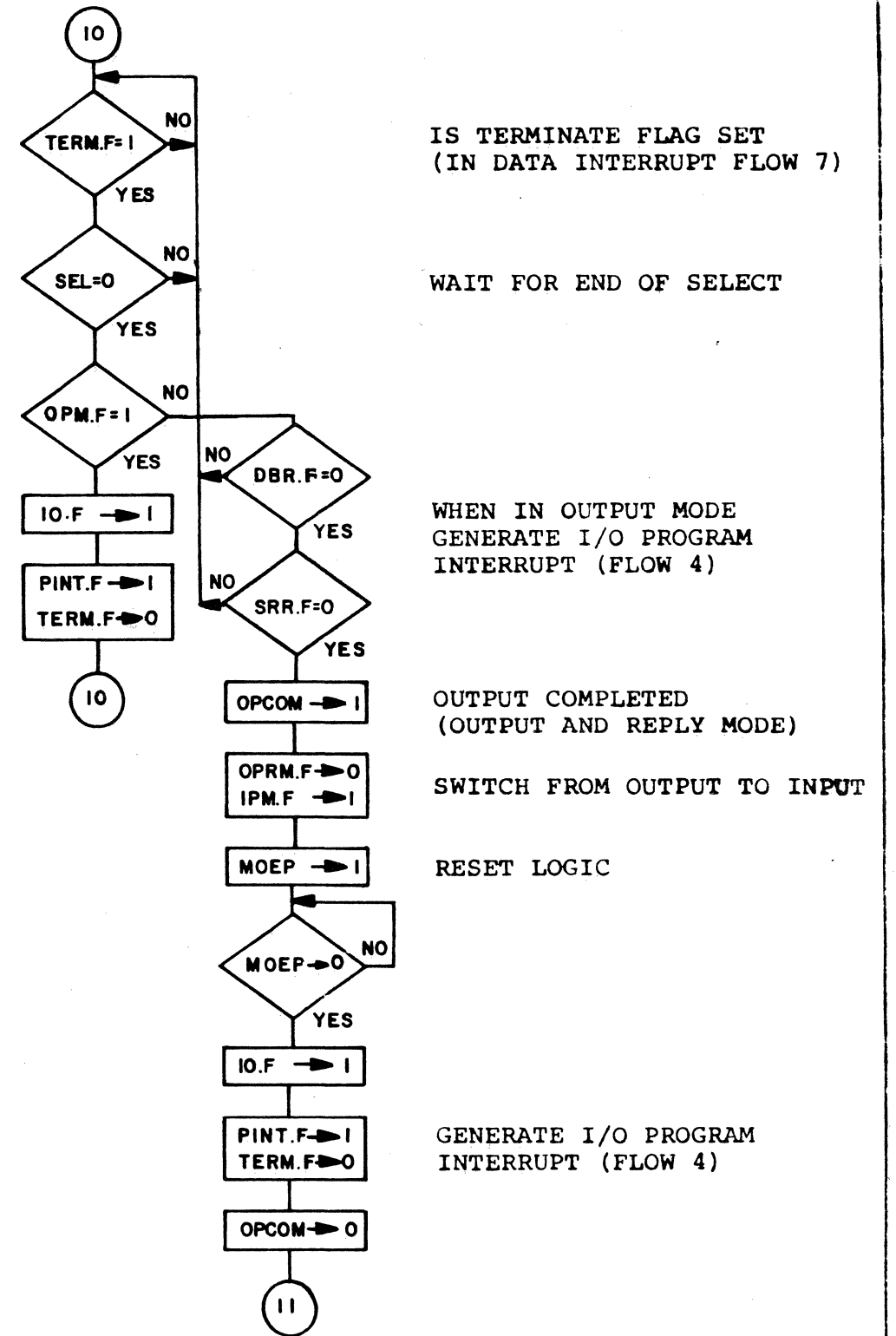
M53-1-STD SYNCHRONOUS ADAPTER		SPEC NO.	REV
BLOCK AND FLOW DESCRIPTION		601-0052222	C
DATE	APPROVAL	SHEET	OF
	NCR	33	42
ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND			

ORIGINATOR	DATE	TITLE	SPEC NO.	REV
		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	601-0052222	C
ENGINEER	DATE	APPROVAL	SHEET	OF
		NCR	34	42
ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND				

7.10 OUTPUT (AND REPLY) MODE — DATA HANDLING



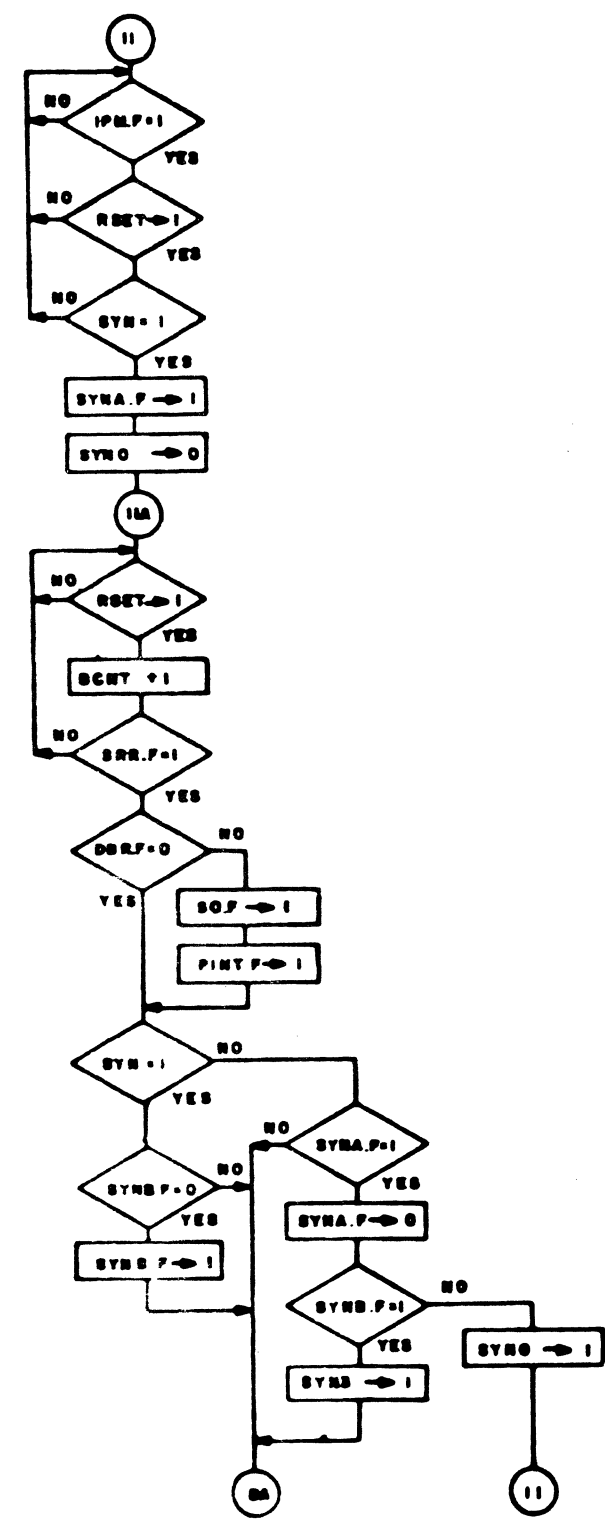
7.11 OUTPUT (AND REPLY) MODE TERMINATION



M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC NO. 601-0052222	REV C
DATE	NCR	ENGINEERING LABORATORY HONOLULU, HAWAII, P.O. BOX 3194 TRECHT, HOLLAND	SHEET 35 OF 42

ORIGINATOR	DATE	TITLE M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION	SPEC NO. 601-0052222	REV C
ENGINEER	DATE	APPROVAL	DATE	NCR ENGINEERING LABORATORY HONOLULU, HAWAII, P.O. BOX 3194 TRECHT, HOLLAND

7.12 INPUT MODE



WAIT FOR FIRST SYN-CHARACTER

GO TO SYN 1

RELEASE BIT COUNTER

SHIFT SRR ONE BIT POSITION WITH NEG. EDGE OF RSET

INCREMENT BIT COUNTER WITH POS. EDGE OF RSET

8 BITS RECEIVED

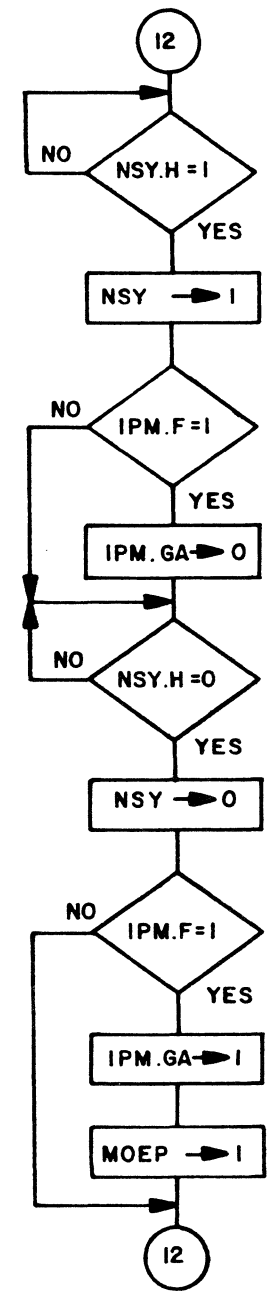
PREVIOUS CHARACTER SAMPLED

SYSTEM OVERLOAD PROGRAM INT. (FLOW 4)

WAS IT A SYN-CHARACTER

SYN.CNT	SYN.A.F	SYN.B.F
0	OFF	OFF
1	ON	OFF
2	ON	ON
3	OFF	ON

7.13 NEW SYNC. - INPUT MODE RESYNC.



NEW SYNC ONE-SHOT TRIGGERED

SEND NEW SYNC TO MODEM

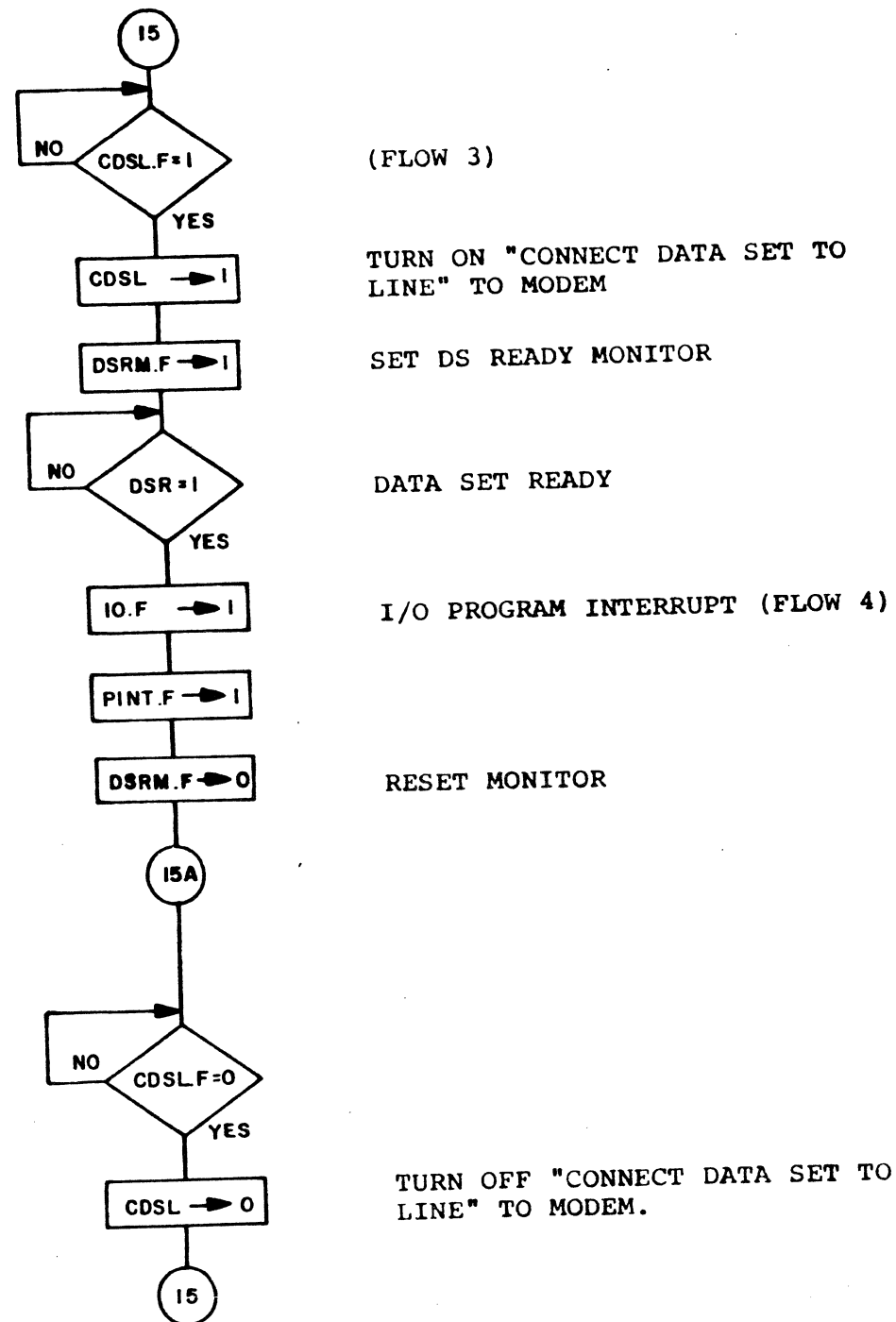
ABORT INPUT MODE

CONTINUE INPUT MODE

RESET SYN.A.F, SYN.B.F BIT COUNTER (FLOW 11)

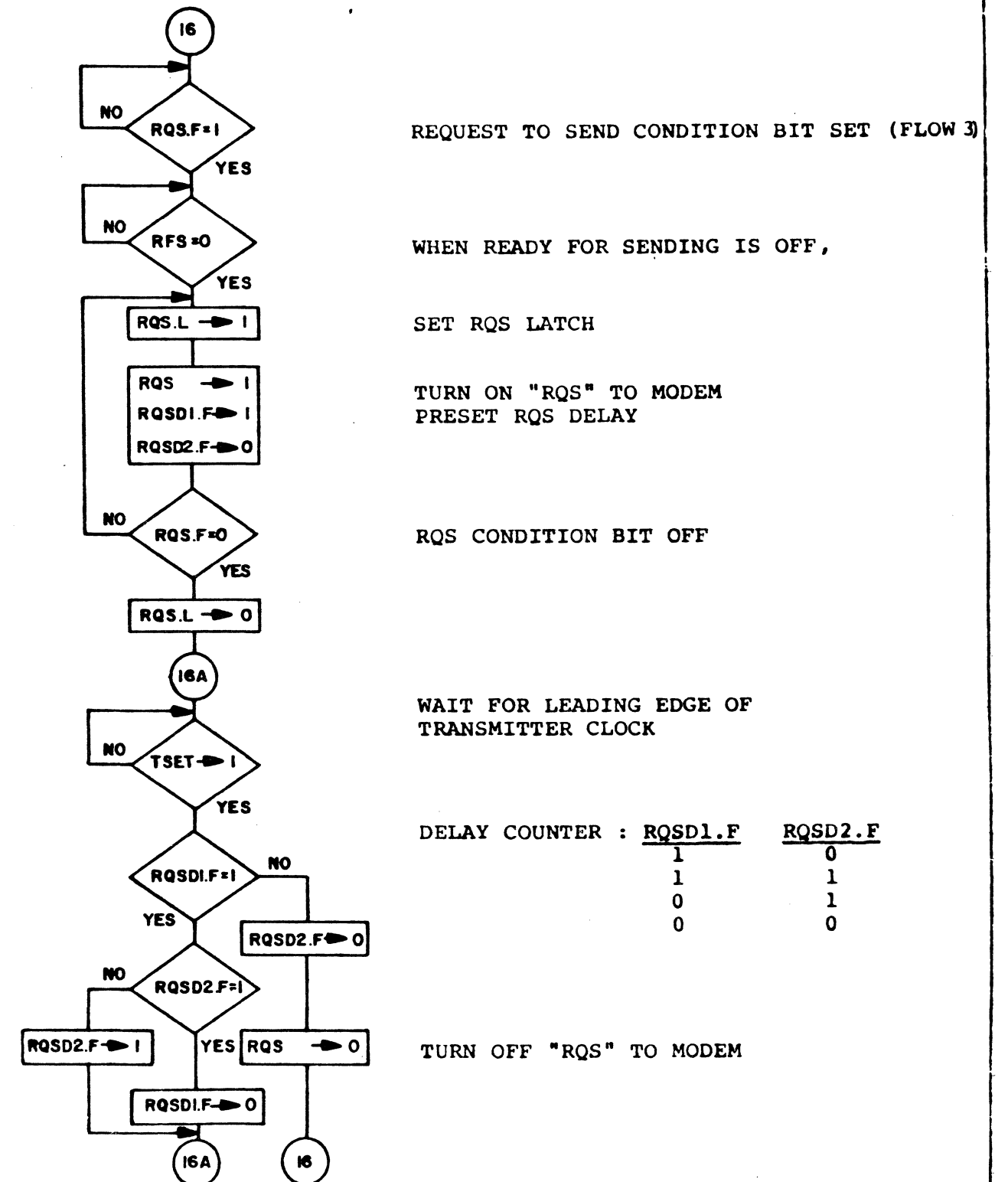
7.16

DATA SET READY MONITOR



7.17

REQUEST TO SEND - READY FOR SENDING



ORIGINATOR		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC NO.	601-0052222	REV	C
DATE	DATE	DATE	DATE	SHEET	41	OF	42
NCR		ENGINEERING LABORATORY CHROMMEDARISLAAN 17, P.O. BOX 3084 UTRECHT, HOLLAND					

ORIGINATOR		M53-1-STD SYNCHRONOUS ADAPTER BLOCK AND FLOW DESCRIPTION		SPEC NO.	601-0052222	REV	C
DATE	DATE	DATE	DATE	SHEET	42	OF	42
NCR		ENGINEERING LABORATORY CHROMMEDARISLAAN 17, P.O. BOX 3084 UTRECHT, HOLLAND					

TABLE OF CONTENTS (CONT'D)

	<u>PAGE</u>
11.0 <u>MAINTENANCE AIDS</u>	7
11.1 Logically Disabling of the Adapter	7
11.2 Self Test Facility	8
11.3 Synchronization Pulses	8
11.4 Indicator Lamps	9
11.5 Testpoints	9
12.0 <u>PREVENTIVE MAINTENANCE</u>	10
13.0 <u>INSTALLATION INSTRUCTION</u>	10
13.1 Adapter Option Implementation	10
13.1.1 Transmission Codes	10
13.1.2 Mark Detection	10
13.1.3 Interval Timer	11
13.1.4 Parity Inversion	11
13.1.5 Received Signal Quality	12
13.1.6 Disabling Automatic Dialing Feature	12
13.2 Modem Cable Installation	12
13.3 Auto Calling Unit Cable Installation	12

1.0 SCOPE

This documentation defines the requirements for the M53-1-STD Synchronous Adapter and contains the adjustments required for proper operation.

2.0 DEFINITION

2.1 Purpose

The M53-1-STD Synchronous Adapter is used as an interface unit between various modems and the M05 General Purpose Mini Computer.

The M53-1-STD Synchronous Adapter will be capable of 2-wire or 4-wire two-way alternate operation on a multi-point or point-to-point switched or non-switched link. Only 8-level ASCII or EBCDIC codes will be accommodated.

When the Adapter is used as a first-level unit on the M05 I/O bus, the Adapter will occupy one of the eight M05 I/O ports. If the position scanner M23-11-STD is used as a first-level interface unit on the M05 I/O port, then the Adapter will occupy one of the eight I/O positions as a second-level interface unit.

2.2 Speed of Operation

Transmission rates are determined by the selected modem. No adjustments are required on the Adapter for speed selection.

ORIGINATOR	DATE	TITLE ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER		SPEC. NO.	REV
ENGINEER	11/71	APPROVAL	DATE	601-0052223	8
NCR			ENGINEERING LABORATORY DRONHEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET	OF
				3	12

ORIGINATOR	DATE	TITLE ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER		SPEC. NO.	REV
ENGINEER	11/71	APPROVAL	DATE	601-0052223	8
NCR			ENGINEERING LABORATORY DRONHEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET	OF
				4	12

2.3 Modem

The Synchronous Adapter will provide the Data Communications equipment interface according to CCITT V.24 and E.I.A. RS-232-C. Only modems providing transmitter and receiver clocks may be used, such as Bell 201, Milgo 2200 or equivalent.

2.4 Auto Calling Units

The Synchronous Adapter will provide an optional Auto Calling Unit (ACU) interface according to CCITT V.24 and EIA-366 which allows the use of Bell 801 type Auto Calling Units.

3.0 PHYSICAL DESCRIPTION

Each Adapter occupies one 14" x 11" printed circuit board (601-0052142) with approximately 70 integrated circuits and 60 discrete components.

3.1 Options

This Adapter is a general purpose device. When it is installed, attention should be given to required option settings (Sec. 13.1) and backpanel connections (Sec. 7.0).

3.2 Features

The only feature of the synchronous adapter is F01, which provides the adapter with the interface for the Bell 801 Auto Calling Unit. See drawing 601-0052224.

3.3 Reference Material

Refer to drawing 601-0052221 for complete listing of material in the field print package.

4.0 ENVIRONMENTAL

The M53-1-STD Adapter has the same requirements as the M05 which houses it.

5.0 POWER REQUIREMENTS

Uses DC power as available in the M05 cage or Auxiliary Adapter cage (see Sec. 8.0).

6.0 SYSTEM GROUND REQUIREMENTS

System Ground is obtained from the M05.

Note: The Adapter provides "logic ground" to the Modem and ACU. It is important that M05, the Modem and ACU be connected to the same AC power source to insure proper operation.

7.0 CONNECTING CABLE REQUIREMENTS

7.1 Scanner Cable (Interface, Signalling Cable) Assembly

This cable assembly is required when Adapter is used as a second-level interface unit. It is used to interconnect up to eight Adapters to their first level scanner. This cable assembly is called out with each M23-11-STD scanner on its Field Print Package.

7.2 Modem Cable (601-0052227)

This cable connects the Adapter to the Modem. This one type of cable will suffice for all normally used Modems (Bell 201, Milgo 2200 etc.). It has 14 leads of 24 AWG, shielded, and jacketed. It is made in only one length, 50 feet.

ORIGINATOR	DATE	TITLE	ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	SPEC. NO.	601-0052223	REV	B
ENGINEER	DATE	APPROVAL	DATE	NCR	ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET	5 OF 12
	11/71						

ORIGINATOR	DATE	TITLE	ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	SPEC. NO.	601-0052223	REV	BA
ENGINEER	DATE	APPROVAL	DATE	NCR	ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET	6 OF 12
	11/71						

7.3 Auto Calling Unit Cable (315-0523422)

This cable connects each Adapter to its associated Auto Calling Unit (801). It consists of 12 leads of 24 AWG, shielded and jacketed. This cable is a feature kit and will be supplied only when automatic dialing operation is desired.

8.0 POWER SUPPLY REQUIREMENTS

D.C. power is supplied by the M05 type of power supply. The Adapter requires the following :

- + 5 V : < 2 Amps
- +12 V : 0.1 Amp
- 12 V : 0.1 Amp

9.0 MECHANICAL ADJUSTMENTS

None required.

10.0 ELECTRICAL ADJUSTMENTS

None required.

11.0 MAINTENANCE AIDS

The following facilities are added to the M53-1-STD for maintenance services.

11.1 Logically Disabling of the Adapter

The Adapter can be logically disabled from the system by grounding Pin 49 (PINT.G) and Pin 50 (DINT.G) on the backpanel.

11.2 Self Test Facility

The I/O character handling functions can be program tested using this diagnostic facility. In the test mode a simple "Bit Level Adapter" is formed that assumes the input mode when the M53-1-STD is in the output mode and vice versa. The timing signals are simulated by using condition Bit b3 (timing). To check the automatic mode change, mode Bit b7 of the M05 I/O Command is used. When this bit is turned ON during a set command the Adapter will only be sensitive to the conditions field of the presented function code. To set up for testing, the modem cable plug and ACU-cable plug have to be removed. The Selftest Connector (601-0052226) has to be placed onto Pins 273 through 300.

Note: Two wires are to be added permanently on the back panel slot of this adapter to have the "Received Signal Quality"-monitor (refer to section 13.1.5) automatically enabled when selftesting is desired. Use 30 AWG wire (007-8953108) to connect
 (1) Pin 270 to Pin 275
 (2) Pin 70 to Pin 276

11.3 Synchronization Pulses

The M53-1-STD can provide under program control a synchronization pulse to give a specific reference point when using external test equipment (oscilloscope).

The leading edge of the synchronization pulse is controlled by the program by issuing a SYNC PULSE function code (bit 15=1). The termination of the pulse, the trailing edge, is effected by the Adapter hardware in two ways :

- a) During Output - the trailing edge will occur prior to the transmission of the first output character (SYN).
- b) During Input - immediately after receipt of the first SYN-character.

At the end of each pulse the function is automatically deactivated. This pulse is available at Pin 54.

ORIGINATOR	DATE	TITLE ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	SPEC. NO. 601-0052223	REV. A
ENGINEER	DATE 11/71	APPROVAL	DATE	SHEET 7 OF 12
NCR ENGINEERING LABORATORY DROMMEDARIJSLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND				

ORIGINATOR	DATE	TITLE ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	SPEC. NO. 601-0052223	REV. B
ENGINEER	DATE 11/71	APPROVAL	DATE	SHEET 8 OF 12
NCR ENGINEERING LABORATORY DROMMEDARIJSLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND				

11.4 Indicator Lamps

There are four indicator lamps on the Adapter :

Top Lamp	Input Mode
2nd Lamp	Ring Indicator Mode
3rd Lamp	Output Mode
Bottom Lamp	Carrier

The lamps, when lit, will signify the following :

- Output Lamp is on when output flip-flop is set.
- Input Lamp is on when input flip-flop is set.
- Ring Indicator Lamp is on when ring indicator flip-flop is set.
- Carrier Lamp is on when the modem interface circuit designated CKT 109 (V.24) respectively CP (RS-232-C) signals the ON-condition.

11.5 Testpoints

The following nineteen testpoints are available at backpanel locations for trouble shooting aid :

<u>Term</u>	<u>Backpanel Location</u>
BCNT 15.GA	65
DBR.F	260
DCD.ZA	59
IOFS.G/	68
IPM.F	62
IPSOF.G/	67
MOEH.G/	266
NSY.H/	265
OPM.F	60
OPRM.F	61
RD.Z	263
RIM.F	63
RQSD1.F	267
SD.G	259
SRRCP.G	262
SRR.F	261
SYNA.F	64
SYNB.F	264
TIMOT.H	66

12.0 PREVENTIVE MAINTENANCE

None required.

13.0 INSTALLATION INSTRUCTION

When the Adapter is used in conjunction with the M23-11-STD position scanner, refer to the Adjustment and Requirement Specifications, drawing 315-0524405 for the installation instructions.

For first-level operation, once the Adapter is plugged into a particular M05 I/O Port, the Adapter Port Number is thus automatically assigned, and the Adapter position number will be zero.

13.1 Adapter Option Implementation

13.1.1 Transmission Codes

To accommodate ASCII or EBCDIC code proper decoding of the associated "SYN" characters is required.

For ASCII "SYN" detection connect strapping point

E7 to E8
and E9 to E10

For EBCDIC "SYN" detection connect strapping point

E7 to E9
and E8 to E10

13.1.2 Mark Detection

This feature is used on input to detect the loss of EOM characters in ASCII non-transparent mode only.

If no data is received the synchronous modem delivers a continuous MARK level. This is interpreted by the Adapter as a stream of Mark bits.

ORIGINATOR	DATE	TITLE	ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	SPEC. NO.	601-0052223	REV	
ENGINEER	11/71	APPROVAL	NCR	ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET	9	OF 12

ORIGINATOR	DATE	TITLE	ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	SPEC. NO.	601-0052223	REV	
ENGINEER	11/71	APPROVAL	NCR	ENGINEERING LABORATORY DROMMEDARISLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND	SHEET	10	OF 12

13.1.2 Mark Detection (Cont'd)

The MARK detection acts upon receipt of a dummy 8 MARK-Bit character; it causes the adapter to reset synchronization control, which inhibits further delivery of characters to the M05 until character synchronization is obtained.

The MARK detection is made operational by connecting strapping point E11 to E12.

13.1.3 Interval Timer

When an interval time is desired of

100 msec : connect strapping point E14 to E15

300 msec : connect strapping point E14 to E13

Without any strappings between E13, 14 and 15 the interval time is nominally 500 msec.

Actual intervals may vary over +15%.

13.1.4 Parity Inversion

To relieve the program from the task of converting parity between asynchronous and synchronous links, both using ASCII code, the synchronous adapter can invert bit 8 of the characters on input as well as on output.

When inversion of bit 8 is desired :

Connect strapping point E1 to E2
and E4 to E5

When no inversion is desired :

Connect strapping point E2 to E3
and E5 to E6

13.1.5 Received Signal Quality

For operation with the Bell 203-type modems the monitor for the interface circuit "Received Signal Quality" must be enabled by adding a 30 AWG wire (007-8953108) between Pin 70 (SQD.Z/) and Pin 270 (SQD.M/) on the backpanel.

13.1.6 Disabling Automatic Dialing Feature

When a system does not require the automatic dialing feature, although it is installed in the adapter, it shall be disabled by wiring Pin 87 (PWI.V) to Pin 100 on the backpanel using 30 AWG wire (007-8953108).

13.2 Modem Cable Installation

(Ref. to Sec. 7.2)

The Modem cable is plugged onto Pins 287 through 300 of the slot where the adapter is installed.

13.3 Auto Calling Unit Cable Installation

(Ref. to Sec. 7.3)

The Auto Calling Unit cable is plugged onto Pins 87 through 100 of the slot where the adapter is installed.

ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	601-0052223	B
ENGINEER	DATE	APPROVAL	SHEET	OF
	11/71	NCR	11	12
<small>ENGINEERING LABORATORY DROMMEDARIJSLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND</small>				

ORIGINATOR	DATE	TITLE	SPEC. NO.	REV
		ADJUSTMENT AND REQUIREMENT SPECIFICATION FOR M53-1-STD SYNCHRONOUS ADAPTER	601-0052223	B
ENGINEER	DATE	APPROVAL	SHEET	OF
	11/71	NCR	12	12
<small>ENGINEERING LABORATORY DROMMEDARIJSLAAN 17, P.O. BOX 3024 UTRECHT, HOLLAND</small>				

FEATURE
DESIGNATION

FEATURE
TITLE

FEATURE KIT
DRAWING NUMBER

F 01

Automatic Dialing

601-0052224

F 02

Modem Cable (11ft)
replacement for
standard 50 ft cable
601-0052227

601-0052655

ENGINEERING FILE

CHANGES: (A) Release no. (B) M53-01 was 693-700			
(C) Added F 02	C	34ER00304	11/12/73
	B	34ER00202	J.V. 10-72
	A	34ER00073	GWV 12-27-71
	REV.	RELEASE NO.	DFTS. DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.

CLASS: M53-01		THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedarislaan 17 - Utrecht - Holland	
PARTS LIST SHEET NUMBERS		START: 22-12-71	NCR
SHEET THRU	FINISH: 22-12-71	UNIT: SYNCHRONOUS ADAPTER	
DRAWING OF THE ASSEMBLY	DFTS: A.K. CHKR: <i>Plot</i>	NAME: INDEX, FEATURE	
SH. NO.	SIZE	DESIGNER: A. Groot	
REV.	APPD: <i>Plot</i> APPD: <i>Plot</i>	SHEET 1 OF 1	
	SUPSD. BY:		601 - 0052256
	SUPERSEDES:	CODE:	

ADAPTER RECORD FORM

ID Number : Port :
 Position :
 Peripheral Device :
 Peripheral Location :
 Modem Type :
 Speed (BPS) :
 Auto Dialing Feature : YES / NO
 Interval Timer (MSEC) : 100 / 300 / 500
 Mark Detection : YES / NO
 Parity Inversion : YES / NO
 Code Set : ASCII / EBCDIC
 Remarks :

CHANGES: (A) Release No. (B) M53-01 was 693-700			
	B	34ER00202	12-27-71
	A	34ER00073	GWV 12-27-71
	REV.	RELEASE NO.	DFTS DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.

CLASS: M53-01		THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drummedonstraat 17 - Utrecht - Holland	
PARTS LIST SHEET NUMBERS	START: 3-12-71	NCR	
SHEET --- THRU	FINISH: 3-12-71	UNIT: SYNCHRONOUS ADAPTER	
DRAWING OF THE ASSEMBLY	DFTS: A.K. CHK: <i>APD</i>	NAME: ADAPTER RECORD FORM	
SH. NO. ---	SIZE	DESIGNER: A. Groot	
REV.		APPD: <i>APD</i> APPD: <i>APD</i>	SHEET 1 OF 1
	SUPSD. BY:		601-0052225
	SUPERSEDES:	CODE:	

SHEET:	1	2	3	4
SIZE:	A	A	A	A
REVISION:	A	A	A	A
	B	B		
	C	C	C	C


CHANGES: (A) Release no.

(B) SHIT 2 : ITEM 3 WAS 007-8912615

(C) M53-01 was 693-700 on all sheets

C	34ER00202	10/72	10/72
B	34ER00147	10/72	10/72
A	34ER00080	10/72	10/72
REV.	RELEASE NO.	DFTS.	DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited


COVER SHEET	CLASS: M53-01	 THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedarislaan 17 - Utrecht - Holland
	START: 12-30-71	
	FINISH: 12-30-71	UNIT: Synchronous Adapter
	DFTS: Tolisma	CHKR: <i>[Signature]</i>
	DESIGNER: A. Groot	NAME: Connector-selftest
	APPD: <i>[Signature]</i>	SHEET 1 OF 4
	SUPSD. BY:	601 - 0052226
	SUPERSEDES:	CODE: -

ITEM	REQD.	PART & DWG. NO.	SIZE	NAME & DESCRIPTIONS	COMPONENT DESIGNATOR
1	1	007-2004401	A	Connector-elect. (female)	
2	17	007-8146308	A	Terminal - Push on	
3	A/R	007-9000230	A	Wire, Electrical Hookup (BU126AWG)	
4	REF	007-9502000	A	Identification, General	
5	REF	007-9503200	A	Terminal crimp spec.	

CHANGES: (A) (B) (C)

C	34ER00202	10/72	10/72
B	34ER00147	10/72	10/72
A	34ER00080	10/72	10/72
REV.	RELEASE NO.	DFTS.	DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited

PARTS LIST SHEET NUMBERS	CLASS: M53-01	 THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedarislaan 17 - Utrecht - Holland
	START: 12-30-71	
SHEET 2 THRU -	FINISH: 12-30-71	UNIT: Synchronous Adapter
DRAWING OF THE ASSEMBLY	DFTS: Tolisma	CHKR: <i>[Signature]</i>
SM. NO. 4	DESIGNER: A. Groot	NAME: Connector-Selftest
REV.	APPD: <i>[Signature]</i>	SHEET 2 OF 4
	SUPSD. BY:	601 - 0052226
	SUPERSEDES:	CODE: -

WIRE NO.	CODED WIRE NUMBER	START		FINISH	
		TERMINAL	TUBING	TERMINAL	TUBING
1	SQD.2/	P1-275		P1-276	
2	RQS.V	P1-293		P1-291	
3		P1-291		P1-288	
4		P1-288		P1-287	
5	SD.V	P1-294		P1-289	
6	CDSL.V	P1-295		P1-290	
7	STIM.V	P1-298		P1-296	
8		P1-296		P1-297	
9	NSY.V	P1-299		P1-292	
10	SIGNAL GRD	P1-300		P1-285	

CHANGES : (A) (C)

REV.	RELEASE NO.	DFTS.	DATE
C	34ER00202	12	12/27/71
A	34ER00080	1	10/21/71

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.



THE NATIONAL CASH REGISTER CO.
Engineering Laboratory
Draaenmedaristraat 17 - Utrecht - Holland

CLASS: M53-01
START: 12-30-71
FINISH: 12-30-71
DFTS. TOLEMACHKR: /g-
DESIGNER: A. Groot
APPD: [Signature] APPD: RR
SHEET 3 OF 4
SUPSD. BY: [Signature]
SJPSEDES:

601 0052226

601-0052226

RECD.	NEXT ASSEMBLY
1	601-0052220

C	34ER00202	J.V. 10/27/71
A	34ER00080	1/10/71
REV.	RELEASE NO.	DFTS. DATE

1 REQD
15 REQD
AS REQD

4. CRIMP PER ITEM 5.
3 RUBBER STAMP MARKINGS AT LOCATION SHOWN IN .25 HIGH CHARACTERS.
2 RUBBER STAMP MARKINGS AT LOCATIONS SHOWN IN .125 HIGH CHARACTERS.
1. TAG-IDENTIFY PER ITEM 4.

ITEM RECD. DWG. NO. NAME

CLASS: M53-01
START: 12-30-71
FINISH: 12-30-71
DFTS TOLEMACHKR: /g-
DESIGNER: R. Groot
APPD: [Signature] APPD: RR
SHEET 4 OF 4
SUPSD. BY: [Signature]
SJPSEDES:

TOLERANZEN FUER MASSE OHNE ANGABE: MILLIMETER NENNMASS: X, XX ± (0.5) .02 X, XX ± (0.127) .005 UNLESS OTHERWISE SPECIFIED DIMENSIONAL LIMITS ARE: MILLIMETER NOM

THE NATIONAL CASH REGISTER CO.
Engineering Laboratory
Draaenmedaristraat 17 - Utrecht - Holland

UNIT: Synchronous Adapter
NAME: CONNECTOR-SELFTEST

NOTES: (A) (C)

MATERIAL:
COATING:
BRAZE:
HEAT TREAT:
HARDNESS:

SCALE: 1:1
CODE: -

WIRE NO.	CODED WIRE NUMBER	ADAPTER END	MODEM END	DESIGNATION	
				CCITT	EIA
1	Brown	287	8	109	CF
2	White	288	5	106	CD
3	Black/White	289	3	104	BB
4	Blue	290	6	107	CC
5	Black	291	22	125	CE
6	Orange/White	292	21	-	-
7	Gray	293	4	105	CA
8	Red	294	2	103	BA
9	Orange	295	20	108/2	CD
10	Red/White	296	15	114	DB
11	Brown/White	297	17	115	DD
12	Green	298	23	111	CH
13	Yellow	299	14	-	HS
14	Violet	300	7	102	AB
15	Shield	open	1	101	AA

RECEIVED
MAY 22 1972

CHANGES:

1 PER A 1ER3AS02

REWORKING FILE

A 34ER00080 1/10-72
REV. RELEASE NO. DFTS. DATE

This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited.

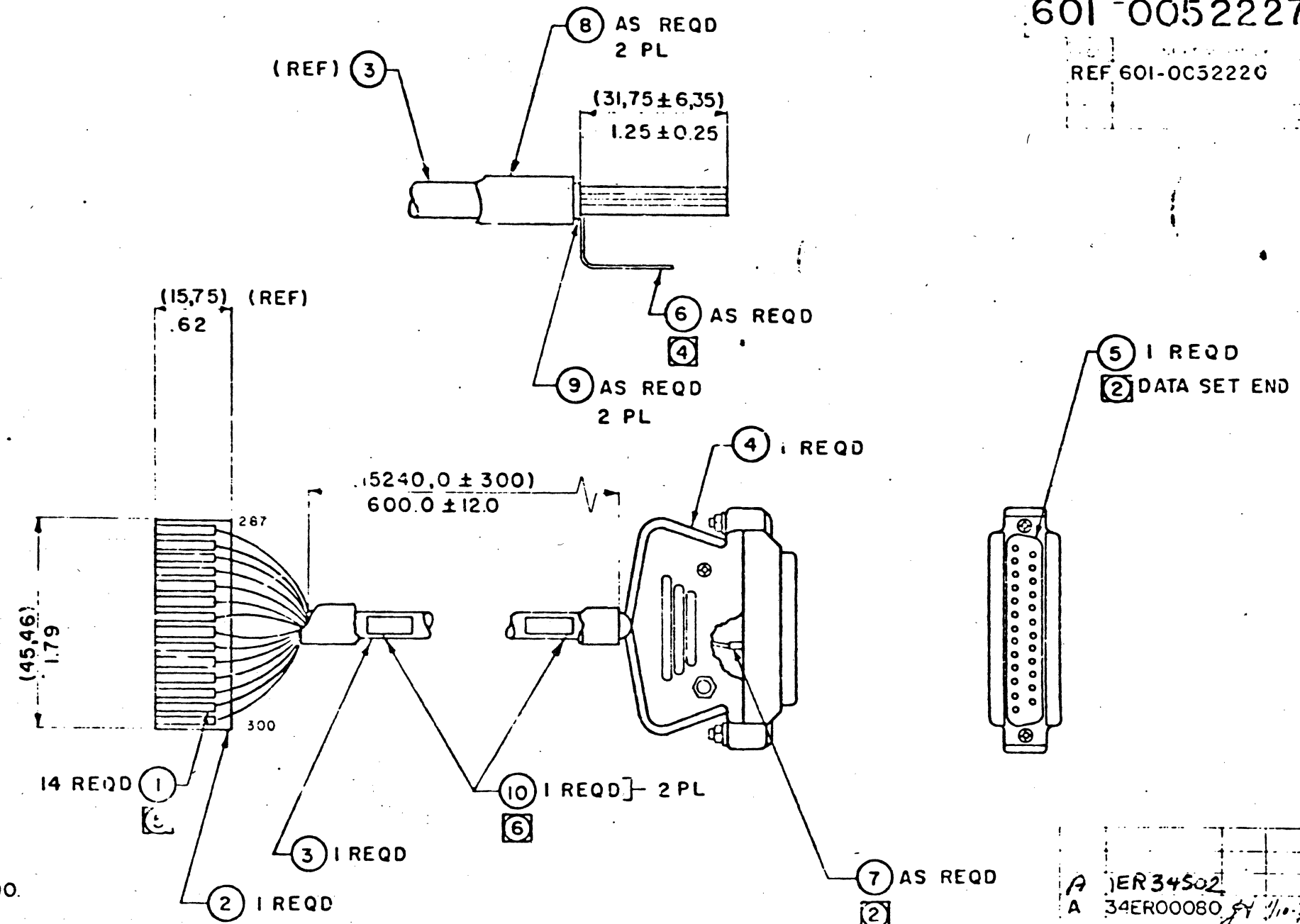
NCR THE NATIONAL CASH REGISTER CO.
Engineering Laboratory
Dronmedariskar, 17 - Utrecht - Holland

CLASS: 693-700		WIRE LIST SHEET NUMBERS START: 12-30-71	
SHEL: 3 THRU 3 FINISH: 12-30-71		UNIT: Synchronous Adapter	
DRAWING OF THE ASSEMBLY DFTSTOLBMA CHKR. <input checked="" type="checkbox"/>		NAME: Modem Cable	
SM. NO. 1	SIZE B	DESIGNER: A Groot	
REV.	APPD. <i>P.</i>	APPD. <i>P.</i>	SHEET 3 OF 4
SUPERSEDES:		CODE: -	
		601 - 0052227	

601-0052227

601-0052227

REF 601-0032220



- ⑥ INSTALL ITEM 10 (LABEL) AS CLOSE AS POSSIBLE TO END OF ITEM 8.
- ⑤ ATTACH ITEM 1 TO ITEM 3 PER 007-9503200.
- ④ TIN SOLDER ITEM 6 TO SHIELD. TYPICAL INSTALLATION AT MODEM END ONLY.
- ③ SOLDER PER 007-9500100.
- ② INSTALL ITEM 7 TUBING AT DATA SET PLUG WIRE ENDS ONLY AND TUBING TO BE OF .25 INCH LENGTHS.
- ① TAG IDENTIFY PER 007-9502000

A 1ER34502
 A 34ER00080

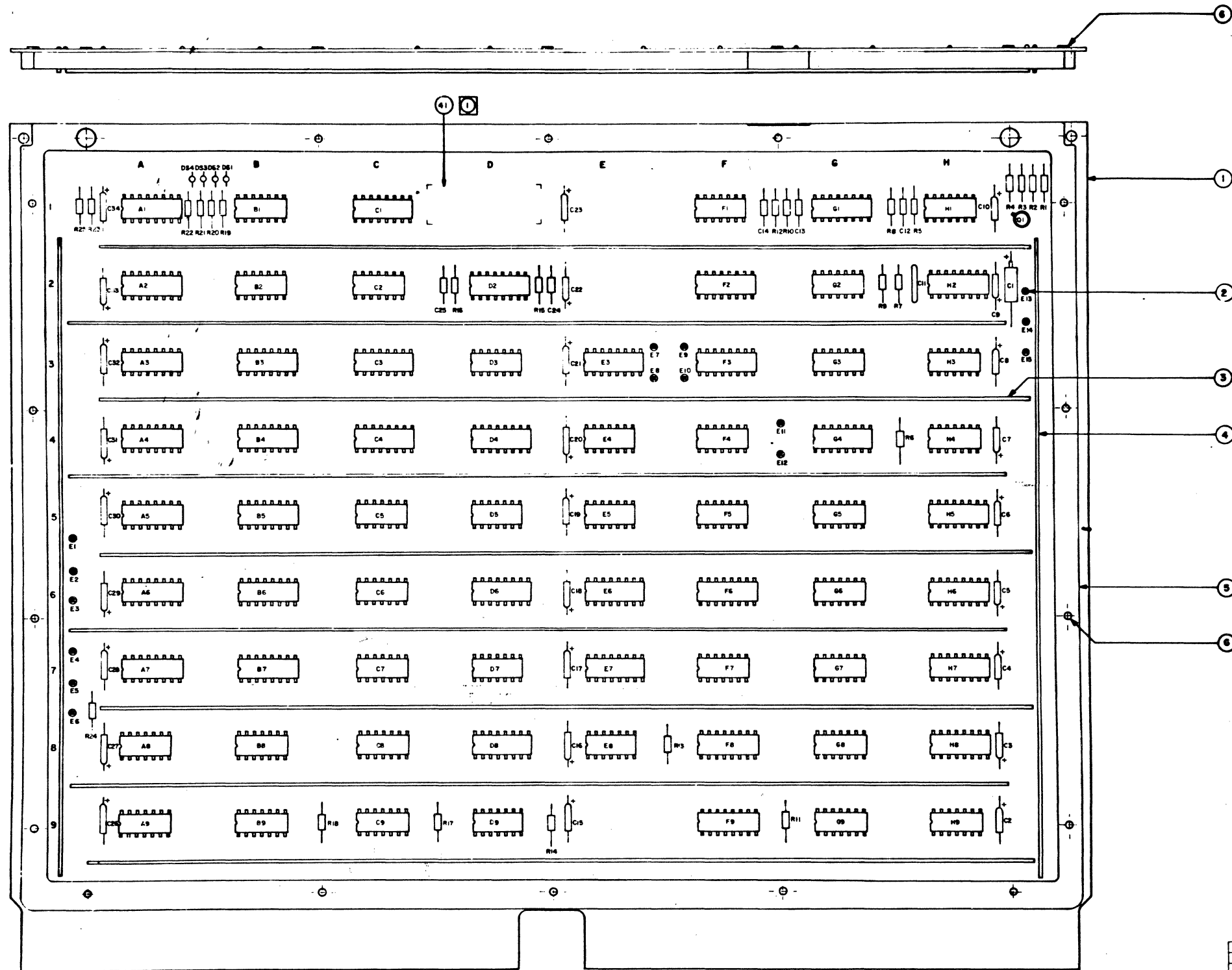
693-700
 12-27-71
 Tolisma
 A. Groot

NCR
 SYNCHRONOUS ADAPTER
 MODEM CABLE

4 4
 601-0052227

ITEM	REQD.	PART & DWG. NO.	SIZE	NAME & DESCRIPTIONS	COMPONENT DESIGNATOR
18	9	007-1695401	A	Circuit, TTL Dual Flip Flop	A1,A2,A7,C3,C4 D8,E7,G4,H5
19	7	007-1697101	A	Circuit, TTL 4 Bit shift register	A4,A6,B4,B6,B7,E3 F3
20	1	007-1696101	A	Circuit, TTL, 4 Bit latch	D6
21	1	007-1697401	A	Circuit, TTL, 4 Bit binary counter	C1
22	1	007-1698001	A	Circuit, TTL Quad 2-input multiplexer	A5
23	2	007-1698101	A	Circuit, TTL Dual monostable multivib.	D2,H2
24	3	007-1694601	A	Circuit, integrated Quad. line driver	G8,H9,G9* (*F01 Feature only)
25	4	007-1665501	A	Circuit, integrated Quad. line receiver	H7,H8,F8*,F9* (*F01 Feature only)
26	1	007-7465502	A	Transistor 2N2369A	Q1
27	3	007-6724651		Resistor 332Ω 1/8W + 1%	R8,10,12
28	4	007-6724681		Resistor 681Ω 1/8W + 1%	R19,20,21,22
29	11	007-6724701		Resistor 1.00K 1/8W + 1%	R5,6,9,11,13,14,17 18,23,24,25
30	2	007-6724818		Resistor 15.0K 1/8W + 1%	R2,4
31	2	007-6724834		Resistor 22.1K 1/8W + 1%	R15,16
32	1	007-6724866		Resistor 47.5K 1/8W + 1%	R7
33	1	007-6724877		Resistor 61.9K 1/8W + 1%	R3
CHANGES: (A) Release No. (B)					
B 34ER00202 JvW 9-72					
A 34ER00073 GWV 12-27-71					
REV. RELEASE NO. DFTS. DATE					
This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited					
THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedarislaan 17 - Utrecht - Holland					
CLASS: M53-01		PARTS LIST SHEET NUMBERS			
START: 11-19-'71		SHEET 2 THRU 4			
FINISH: 11-19-'71		DRAWING OF THE ASSEMBLY			
DFTS: G.W.V. CHKR: <i>[Signature]</i>		SH. NO. 5			
DESIGNER: A.M. WORMGOOR		SIZE E			
APPD: <i>[Signature]</i> APPD: <i>[Signature]</i>		REV.			
SHEET 3 OF 5		601-0052142			
SUPSD. BY:		SUPERSEDES:			
CODE: -					

ITEM	REQD.	PART & DWG. NO.	SIZE	NAME & DESCRIPTIONS	COMPONENT DESIGNATOR
34	1	007-6724901		Resistor 100K 1/8W + 1%	R1
35	2	007-1131511		Capacitor 39pF + 10%	C24,25
36	3	007-1131525		Capacitor 560pF + 20%	C12,13,14
37	1	007-1132109		Capacitor 0.22μF + 20%	C11
38	27	007-1158901		Capacitor 12μF 6V	C2-10,15-23,26-34
39	1	006-4025133		Capacitor 22μF + 5%	C1
40	4	007-2520502		Light emitting diode	DS 1-4
41	1	007-4050933		Identification Label	
CHANGES: (A) Release no. (B)					
B 34ER00202 JvW 9-72					
A 34ER00073 GWV 12-71					
REV. RELEASE NO. DFTS. DATE					
This drawing and information thereon is the property of the National Cash Register Company and all unauthorized use and reproduction is prohibited					
THE NATIONAL CASH REGISTER CO. Engineering Laboratory Drommedarislaan 17 - Utrecht - Holland					
CLASS: M53-01		PARTS LIST SHEET NUMBERS			
START: 11-19-'71		SHEET 2 THRU 4			
FINISH: 11-19-'71		DRAWING OF THE ASSEMBLY			
DFTS: G.W.V. CHKR: <i>[Signature]</i>		SH. NO. 5			
DESIGNER: A.M. WORMGOOR		SIZE E			
APPD: <i>[Signature]</i> APPD: <i>[Signature]</i>		REV.			
SHEET 4 OF 5		601-0052142			
SUPSD. BY:		SUPERSEDES:			
CODE: -					



SCHEMATIC	NO	601-0052135	601-0052142
MASTER-CIRCUIT "A"	NO	601-0052136	
MASTER-CIRCUIT "B"	NO	601-0052137	
MASTER-SCREEN "A"	NO		601-0052220
MASTER-SCREEN "B"	NO		
MASTER-MARKING	NO		
BOARD-PRINTED	NO	601-0052141	
BOARD-PLASIN	NO		
BOARD-ASSEMBLY	NO		
LIST-DRILL COORDINATE	NO		

ADHERE IDENTIFICATION LABEL NEAR SIDE OR FAR SIDE

RELEASE NO. M33-01 WAS 893-70C ADDED ITEM 41

M33-01 N.C.R. SYNCHRONOUS ADAPTER BOARD-PLUG

601-0052142