

PL.I (10w .1 MOLEX) AUXILIARIES (See External Connections)

			REAR PANEL AUX-I/P Connector
Bn	1	AUX1 N/O	Pin 1
R	2	AUX2 N/O	Pin 2
O	3	AUX1,2 COMMON	Pin 3
Y	4	AUX3 N/O	Pin 4
Gn	5	AUX3 COMMON	Pin 5
Be	6	AUX3 N/C	Pin 6
V	7	AUX4 N/O	Pin 7
Gy	8	AUX4 COMMON	Pin 8
W	9	AUX4 N/C	Pin 9
	10	Polarizing	

PL.J (6w 0.1 MOLEX) - ADDITIONAL AUXILLIARIES OPTION (NOT FITTED)

1	DO NOT USE
2	DO NOT USE
3	
4	AUX6 N/O
5	AUX6 COMMON
6	AUX6 N/C

PL.K (26w IDC) - PRINTER INTERFACE (CENTRONICS PARALLEL)(See External Connections)

<u>CABLE</u>	<u>PIN</u>	<u>SIGNAL</u>	<u>SOURCE/DESTINATION</u>
24w RIBBON			REAR PANEL PRINTER Connector
	1	PRINTER STROBE	Pin 1
	2	DATA 0	Pin 2
	3	DATA 1	Pin 3
	4	DATA 2	Pin 4
	5	DATA 3	Pin 5
	6	DATA 4	Pin 6
	7	DATA 5	Pin 7
	8	DATA 6	Pin 8
	9	DATA 7	Pin 9
	10	/ACK	Pin 10
	11	BUSY	Pin 11
	14-22	0V	Pins 14-22

PL.L (6w 0.1MOLEX) - I/P SIGNALS (See External Connections) REAR PANEL AUX-I/P Connector

Bn	1	OVI	Pin 11
R	2	I/P 1	Pin 12
O	3	I/P 2	Pin 13
Y	4	I/P 3	Pin 14
Gn	5	I/P 4	Pin 15
	6	Polarizing	

PL.M (Solder Leads) - DATUMS, SPINDLE SPEED DET. (Wired direct to C02)

Be	1	OVI	C02-9
Bk	2	X DATUM	C02-2
Bn	3	Y DATUM	C02-4
R	4	9VI DATUM/SPDL.SPD DET +	C02-1,3,5,7
O	5	Z DATUM	C02-6
Y	6	SPINDLE SPD	C02-8

PL.N (3w 0.1MOLEX) - EXTERNAL VIDEO 1 (See External Connections) REAR PANEL Connector

W/Bk	1	VIDEO COMMON	CONN. OUTER
O/R	2	1V COMP.VIDEO	CONN INNER
	3		

PL.O (3w 0.1MOLEX) - EXTERNAL VIDEO 2 (See External Connections) REAR PANEL Connector

W/Bk	1	VIDEO COMMON	CONN OUTER
O/Bk	2	1V COMP VIDEO	CONN. INNER
	3		

PL.P (8w 0.1MOLEX) - SPINDLE CONTROL SIGNALS

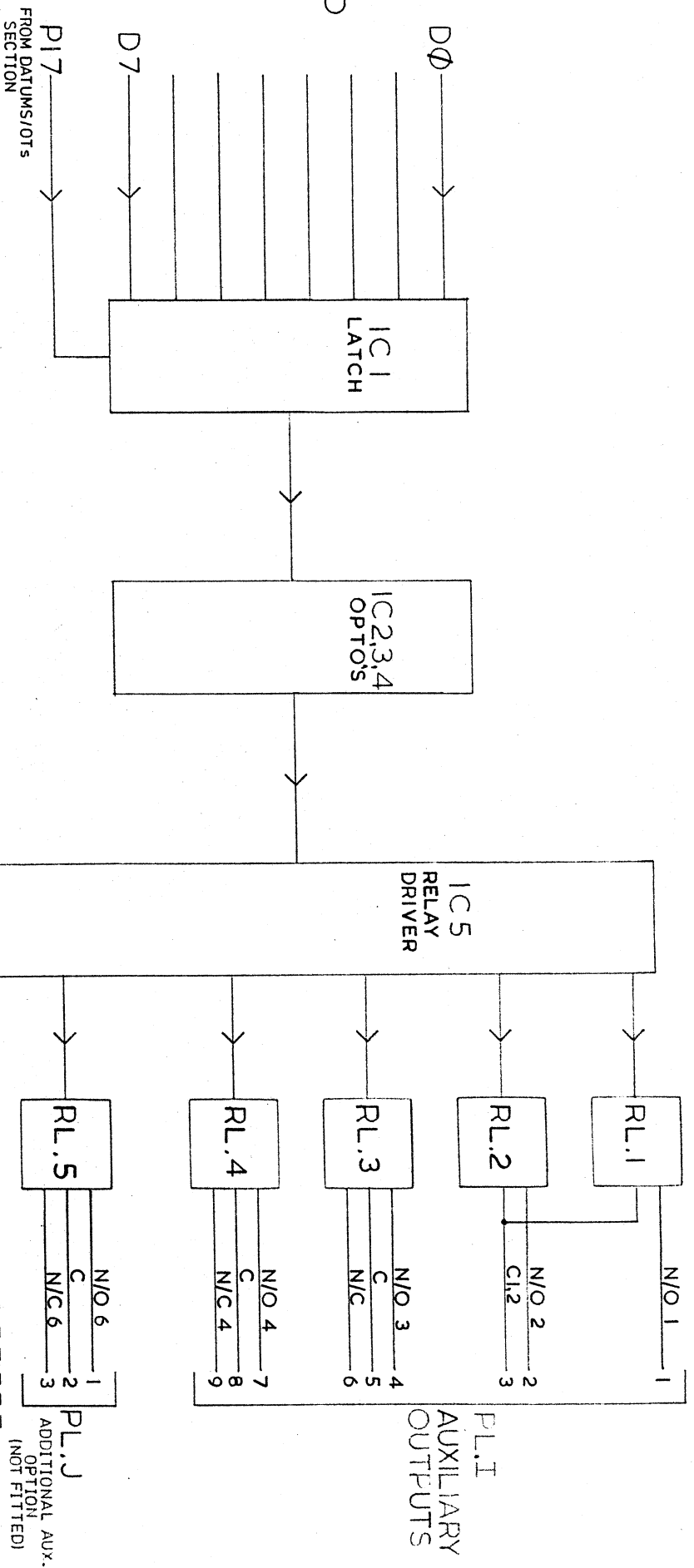
OPTION 1 PARAJUST CONTROLLER (Very Early Systems ONLY)

Bn	1	SPEED REF SIG	PARAJUST TB1-2
	2		
	3		
	4		
Gn	5	SPINDLE COMMON	PARAJUST TB1-4
Be	6	SPINDLE ON N/O	PARAJUST TB1-6
V	7	OV D.C.	PARAJUST TB1-1
Gy	8	SPINDLE +12v SUPPLY	PARAJUST TB1-3

OPTION 2 - Brown & Prestel Controller
(Screened cable colours in brackets)

Bn (Bk)	1	SPEED REF SIG	TB1-11
O (Bn)	2	SPINDLE ON	TB1-8
Y (R)	3	SPINDLE ON COMM	TB1-7
R (Y)	4	SPINDLE FWD	FANNING STRIP PIN 2
Gn (Gn)	5	SPINDLE DIRN COM	FANNING STRIP PIN 1
Be (Be)	6	SPINDLE REV	FANNING STRIP PIN 3
V (V)	7	SPINDLE OV	TB1-9
Gy (W)	8	SPINDLE +12V SUPPLY	TB1-12

BUFFERED
 DATA
 BUS
 (FROM CPU)



NORTH EAST ELECTRONICS

NOTES

RL3 IS LOCATED IN POWER SECT.

TRIAC

AUXILIARY BLOCK DIAGRAM

30/9/85

CE

System errors

A.1 Host captured errors

Host captured errors are errors generated and then captured by the host computer. A list of these errors is given below:-

(1) SYSTEM ERROR

Indicates that a fatal operating system fault has occurred beyond the control of the software.

(ii) SMCU is not responding

Will occur when the host is expecting a serial reply from the SMCU and a predefined delay has elapsed with no reply.

In order to respond the SMCU must be:-

i) connected and switched ON.

ii) operating at the same baud rate, parity and data bit count as the host.

iii) in a 'ready' condition indicated by its front panel indicator flashing regularly twice per second. (Other flash sequences can be reset by the 'RESET' key on the keypad).

(iii) ERROR - MOVE EXCEEDS MACHINE LIMITS

Will occur when an attempt is made to move any of the 3 axes below zero or above the limit defined in the Machine Configuration section.

(iv) ERROR - INVALID SMCU PROGRAM BLOCK

Will indicate that an attempt has been made to load an SMCU RAM program which contains invalid RAM program blocks.

(v) ERROR - MORE THAN 4 REPEAT LEVELS NESTED.

Will indicate that an attempt has been made to introduce another repeat level within 4 others.

(vi) ERROR - START LABEL NOT FOUND

Will indicate that another block contains a reference to a label which does not exist.

(vii) ERROR - END LABEL NOT FOUND

Will indicate a Repeat block has specified an End Label which does not exist.

SMCU captured errors

SMCU captured errors are errors generated by the SMCU and then transmitted via the serial link to the host to be decoded and displayed.

If the SMCU is being operated by it's keypad, errors are indicated by it's front panel indicator (see section 3 - Error Indicator).

(i) DATUM INACCURACY - X, Y, Z

The machine position after a machine datum is compared to machine position stored from the last datum, if a difference of greater than the permitted datum error is found, then this error will be produced.

(ii) COMMAND ERROR

Will indicate that an unrecognised character in the current mode of operation, has been received by the SMCU.

(iii) SERIAL ERROR

Will indicate that a character received by the SMCU has failed the parity check.

(iv) CHARACTER DELAY ERROR

Will indicate that a predefined delay has elapsed between transmission of characters to the SMCU during a command sequence.

(v) DATA/CHECKSUM ERROR

Will indicate an invalid character within a command sequence has been received by the SMCU or the accompanying checksum was incorrect.

(vi) X Y Z AXIS DRIVE FAULT

Will indicate that the axis or axes on which movement has been attempted has a drive fault.

(vii) EXTERNAL STOP PRESSED

Will indicate that the SMCU External stop has been pressed.

(viii) TURN DRIVES ON

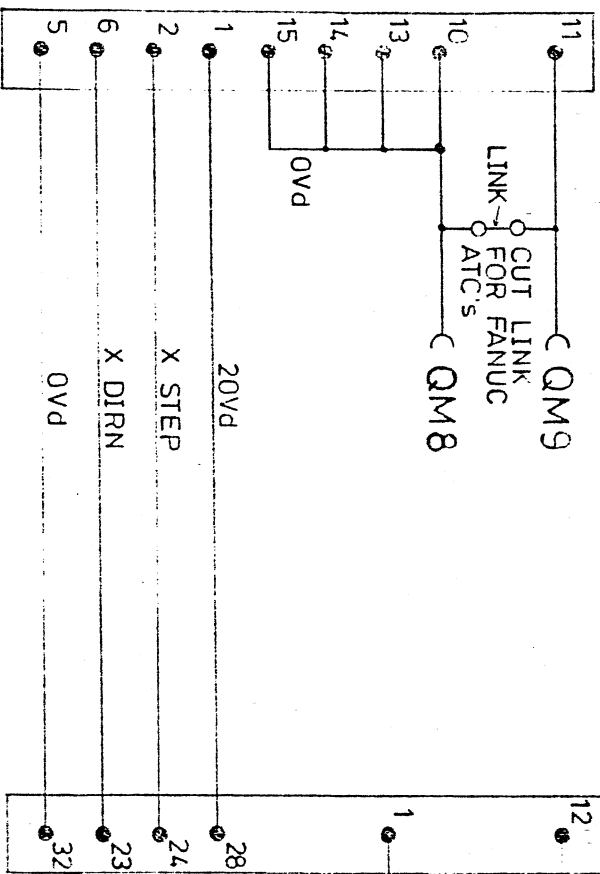
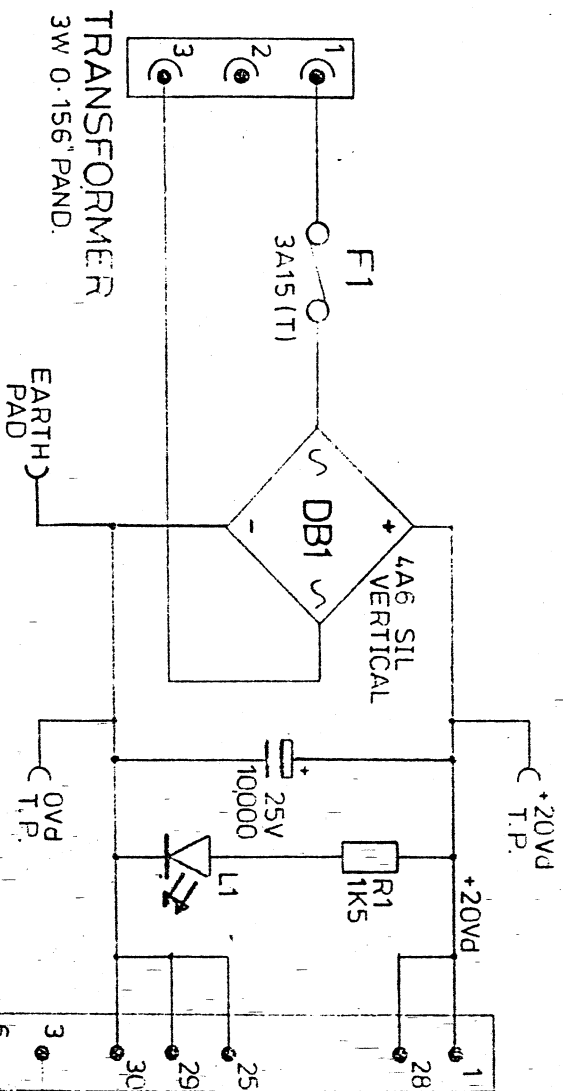
Will occur when movement is attempted on any axis when no drive power is present.

(ix) DATUM DETECTOR NOT FOUND

Will indicate that after a predefined number of steps of movement, no datum detector has been encountered.

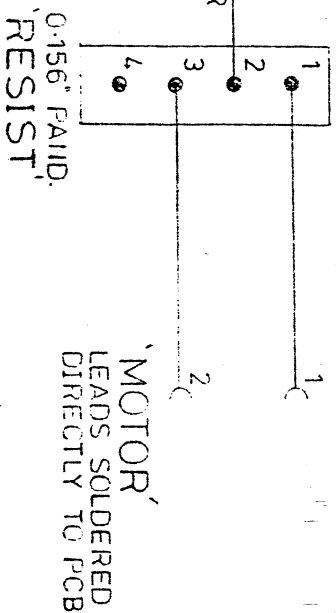
(x) LIMIT EXCEEDED IN X+ X- Y+ Y- Z+ Z-

Will indicate that one or more of the machine overtravel switches have been activated.



16 WAY
PCB RIBBON
HEADER
(TO X11)

DRIVE
CARD
CONNECTOR



NORTH EAST ELECTRONICS LTD.

NOTES:

AUTO TOLLCHANGER

POWER SUPPLY BD.

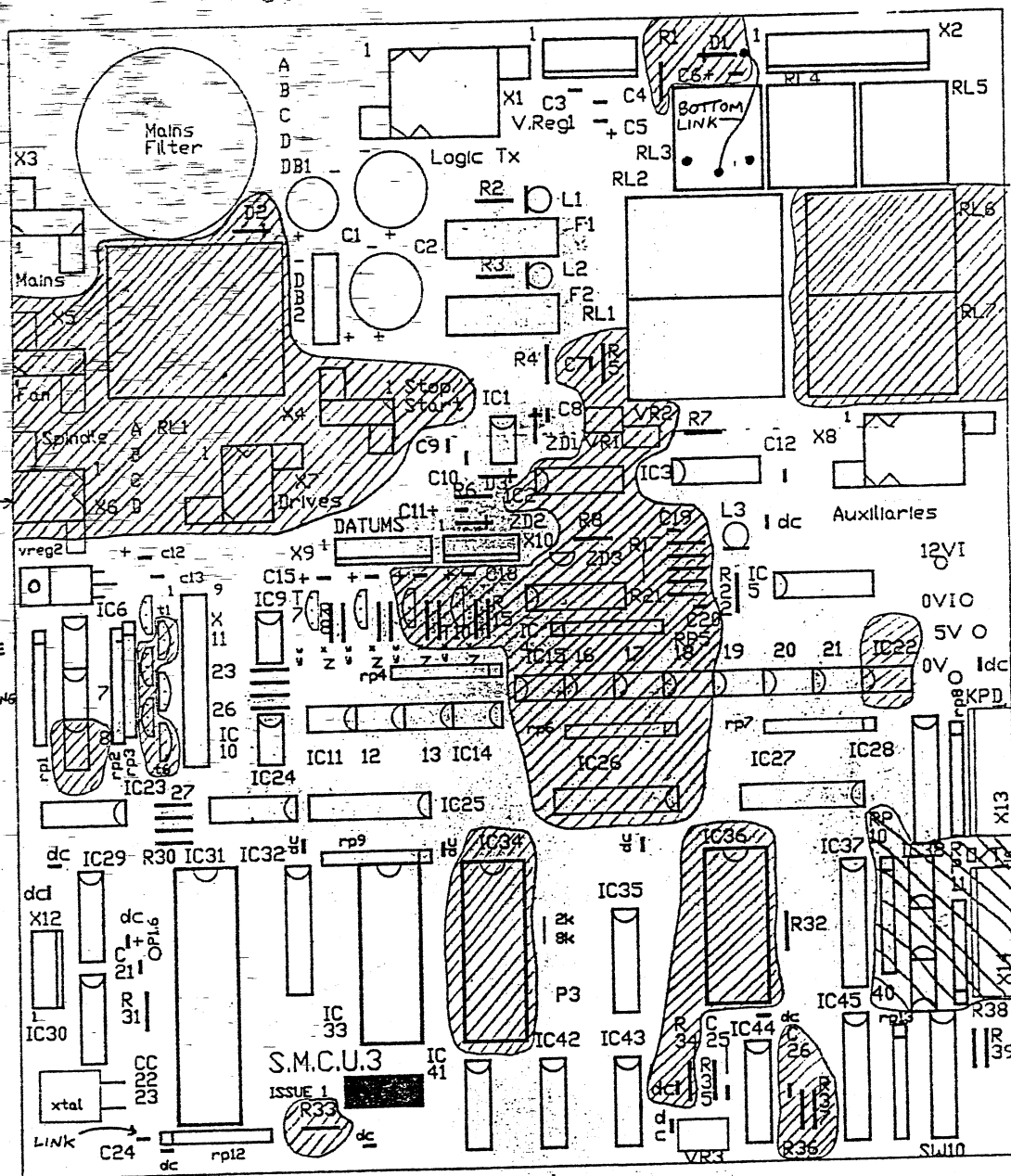
SHEET 1 OF 4


12/10/87

REV1

CE

DENFORD
TRAC AND FANUC AUTOTOOLCHANGER SYSTEMS
PCB LAYOUT REV 9 14/10/87



 DO NOT FIT THESE COMPONENTS

 THESE COMPONENTS ONLY FITTED FOR FANUC CONTROLLERS.

IC38, IC39, IC40, RP10, RP11, X14

MODS.

1) ON TRIAC AND FANUC TOOLCHANGERS, ADD LINK FROM D1 (END NEXT TO CONNECTOR) TO RL3 COMMON (MIDDLE PIN OF 3 CONTACTS) ON BOTTOM OF BOARD.

ADD LINK INSTEAD OF C24

ADD 270K RESISTOR AND 100n CAPACITOR FROM SPINDLE GROUND TO CN BELOW X6 AS IN DWG 1. - ALSO DRILL OUT VREG MTG HOLE TO BREAK TOP/BOTTOM CONTACT.

LINK IC29 PIN 9 TO IC29 PIN 10, AND IC29 PIN 12 TO IC29 PIN 13
FAN CONNECTOR NOT FITTED ON PCB.

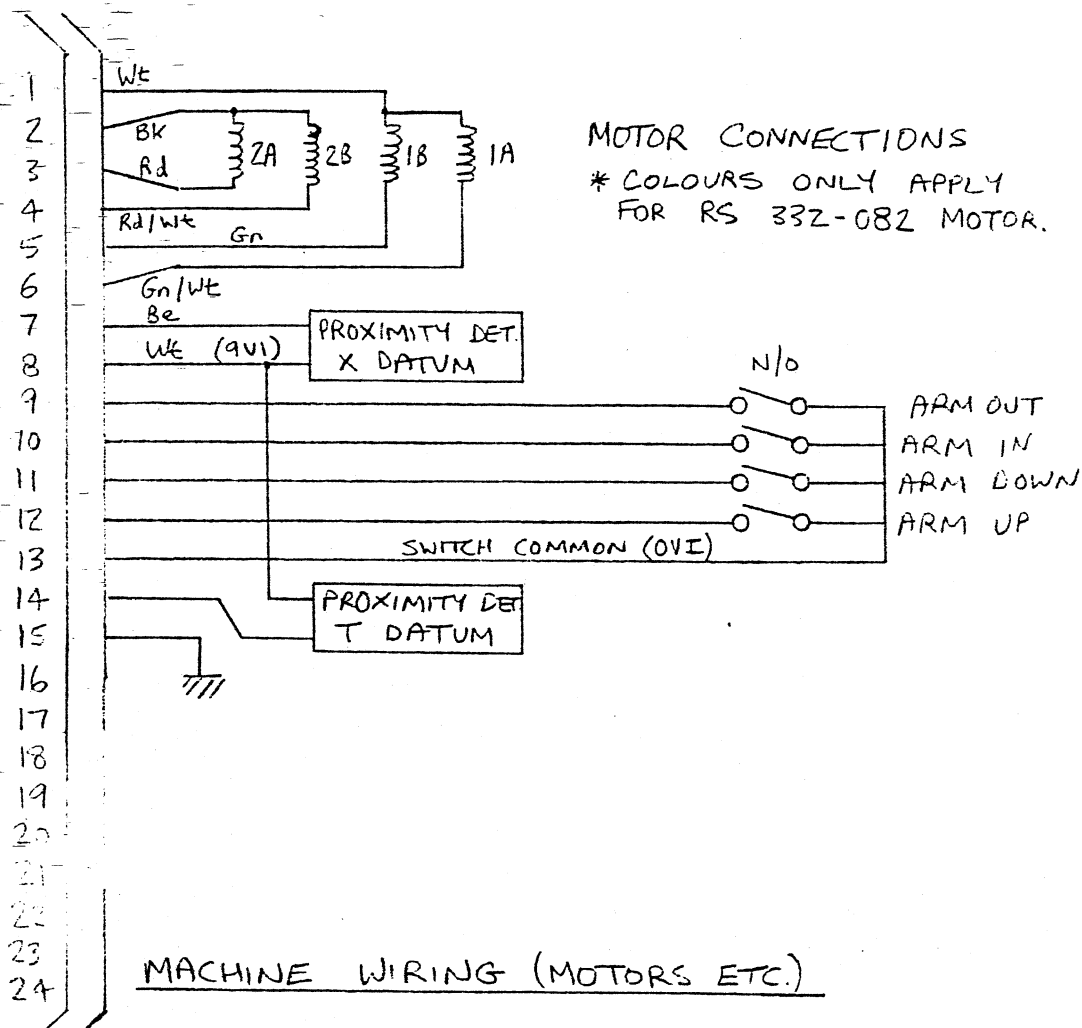
2) ON TRIAC TOOLCHANGERS ONLY, ADD LINKS FROM PIN 5 TO PIN 6, AND FROM PIN 7 TO PIN 8
OF IC38, IC39 AND IC40
LINK IC31 PIN 13 TO IC31 PIN 20

3) ON FANUC TOOLCHANGERS ONLY, ADD LINK FROM IC37 PIN 6 TO IC31 PIN 13.

DENFORD TOOLCHANGER

2/7/87

REV 2.



24 WAY QM (FEMALE) IN ATC.

TO BASE
PLATE EARTH
VOLT.

12" 32/0-2
Gn/Yw

TO 15V
WINDING
OF NEW
TRANSFORMER
LENGTH 2"

F1 = 3.15A (T)

EARTH

+VA T.P.

DRIVE CARD FOR SD2

16W PCB HEADER

RIBBON
CABLE TO
X11
LENGTH =

0M80
0M90
0-1BKO
Rd/BKO
Bn O
Rd O
Or O
Yw O

WE

OVD
T.P.

10"

0-1BKO
Rd
10"
Rd
200F 15K
METAL CAN
RESISTORS

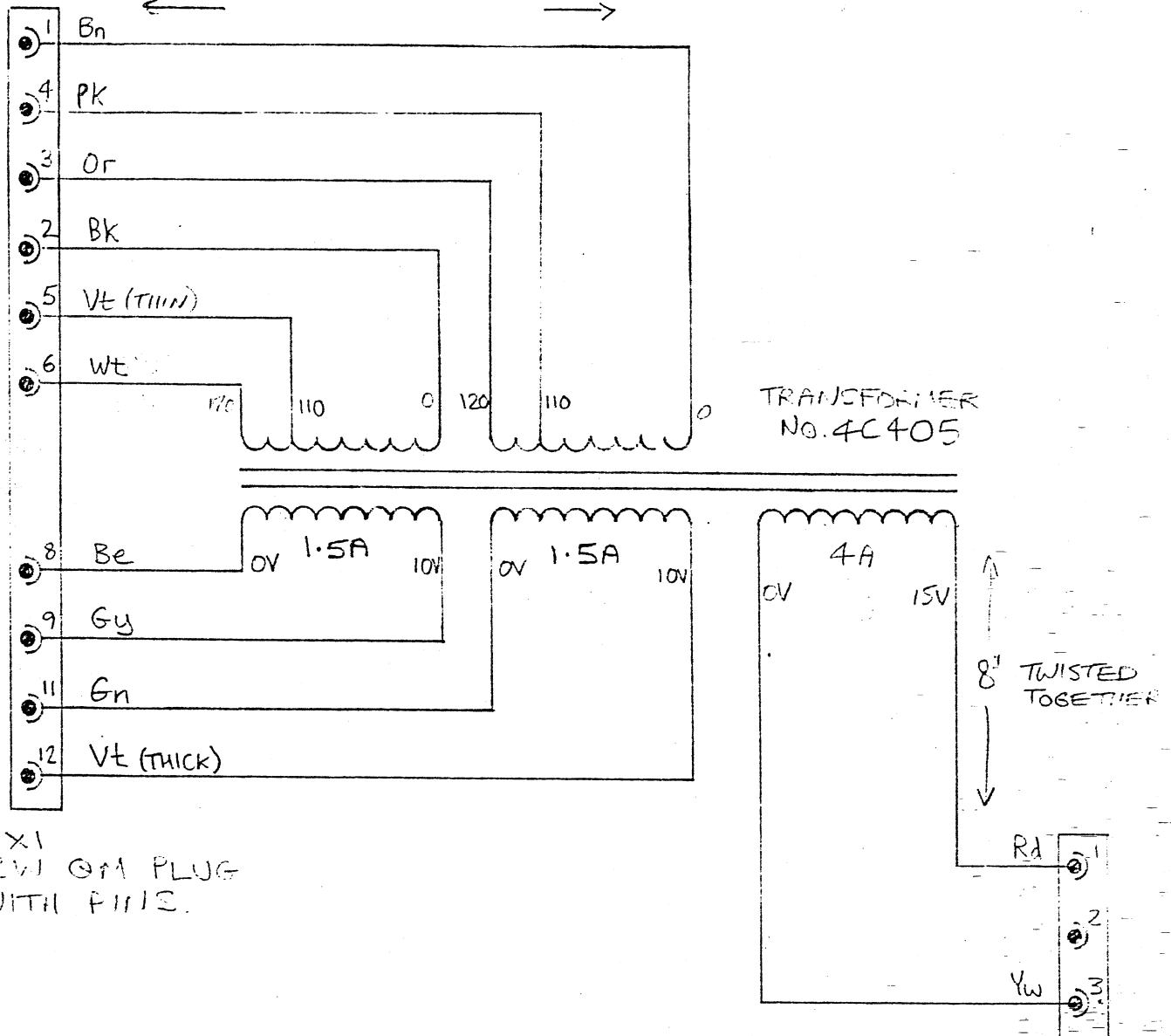
ENDS TERMINATED
WITH 0M100'S
(ONLY EITHER OF EITHER)
SYSTEMS

ENDS
TERMINATED
WITH 0M100'S
SOCKETS.

NORTH EAST ELECTRONICS LTD.
DENFORD TOOLCHANGER
POWER SUPPLY WIRING

SHEET 2 OF 4
ISSUE 1 REV 1

SHROUD X1 CONNECTIONS WITH
RILGAIN 12" LONG.



X1
12V 0.1A PLUG
WITH PINS.

3W 0.1A
MOLEX

SMCU TOOL CHANGER
TRANSFORMER TERMINATION DRAWING
SHEET 1 of 18 ISSUE 3 REV 2.

DENFORD TOOLCHANGER

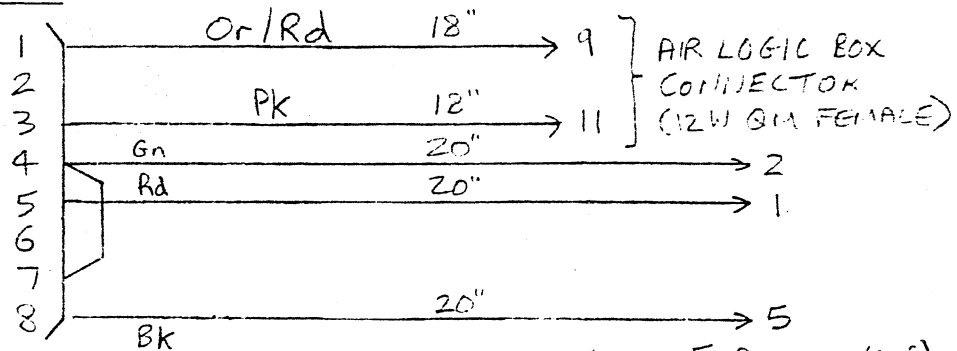
2/7/87 ISSUE 3 REV 1

CONNECTOR X2

SHEET 2 OF 12

8W MOLEX (0.156")

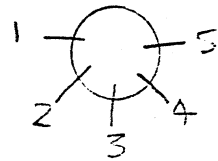
PIN



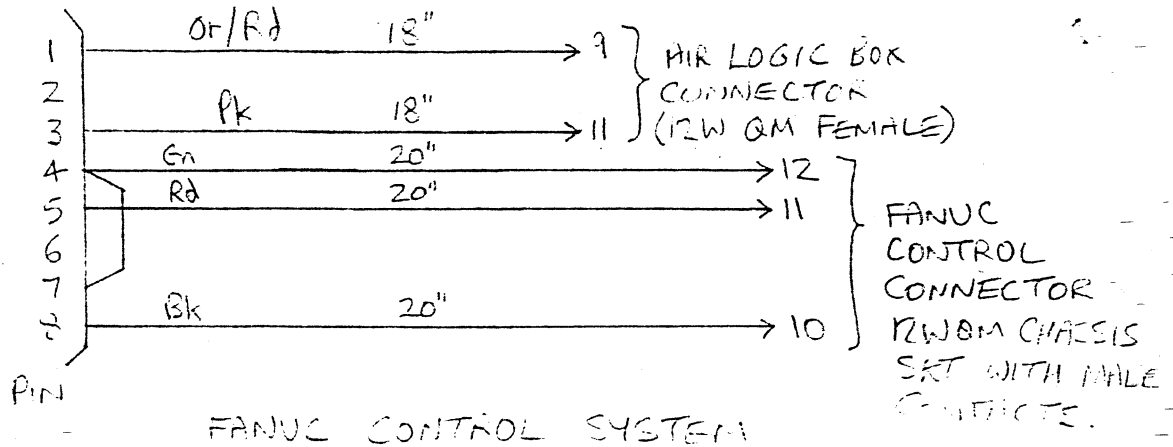
ALL CABLE
16/0.2

5 PIN DIN (60°)
TRIAC LINK
(BACK PANEL)

TRIAC CONTROL SYSTEM



VIEWED FROM
SOLDERED SIDE



FANUC CONTROL SYSTEM

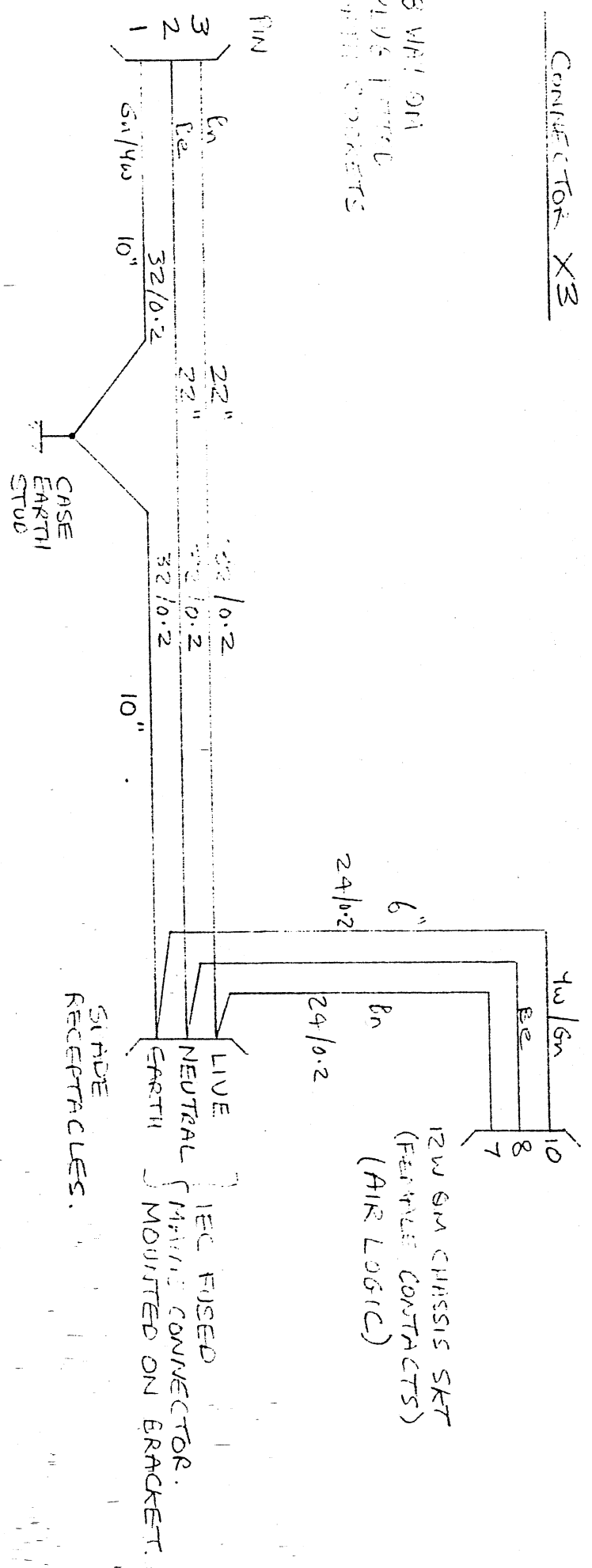
DEFCON 1 06/11/1987

13/10/87 ISSUE 3 REV 1

SHEET 3 OF 12

CONNECTOR X3

3 WIRE ON
PLUS 1 WIRE
WITH CONTACTS

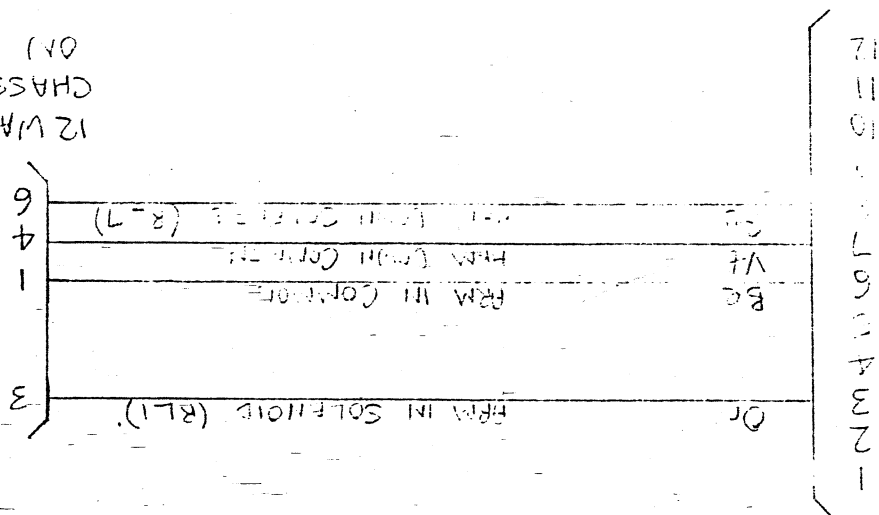


ALL CASES 16-10-2

LENGTH 16"

ADDITIONAL

12 VOLT OM
CHASSIS (FEMALE)
ON BRACKET



Pin

12 VOLT OM
PLUG FEMALE
ON BRACKET

CONNECTOR X8 - CHASSIS 16-10-2

14-17-87 ISSUE 3 REV 1

DENFORD FOOT CHAIR

DENFORD TOOL CHARGER

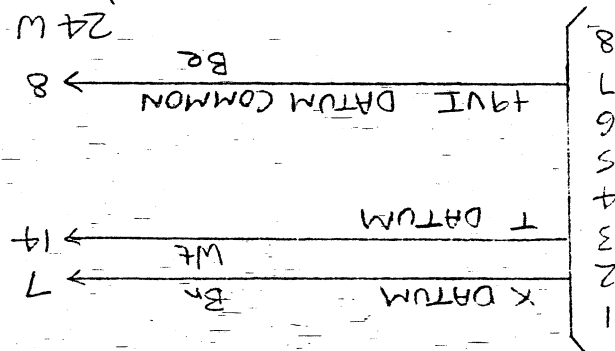
2/7/87 ISSUE 3

REV 1

CONNECTOR X9 SHEET 5 OF 18

8W MOLEX

PIN



24W Q.M (FEMALE)
MOTORS, ON BRACKET
16" LONG 7/0.2 CABLE

MACHINE CONNECTIONS

DEFINITION TOOL CHANGES

DATE: 11/11/15 BY: 3

CONNECTOR X10 SHEET 6 OF 18

6 WAY MOLEX

PIN

6	Ba	SWITCH COMMON	13
5	Or	ARM OUT SWITCH	9
4	Yb	ARM DOWN SWITCH	11
3	Gn	ARM UP SWITCH	12
2	Ba	ARM IN SWITCH	10
1			

16" LONG

24 W OM

(ISMA-6)

(MOTORS)

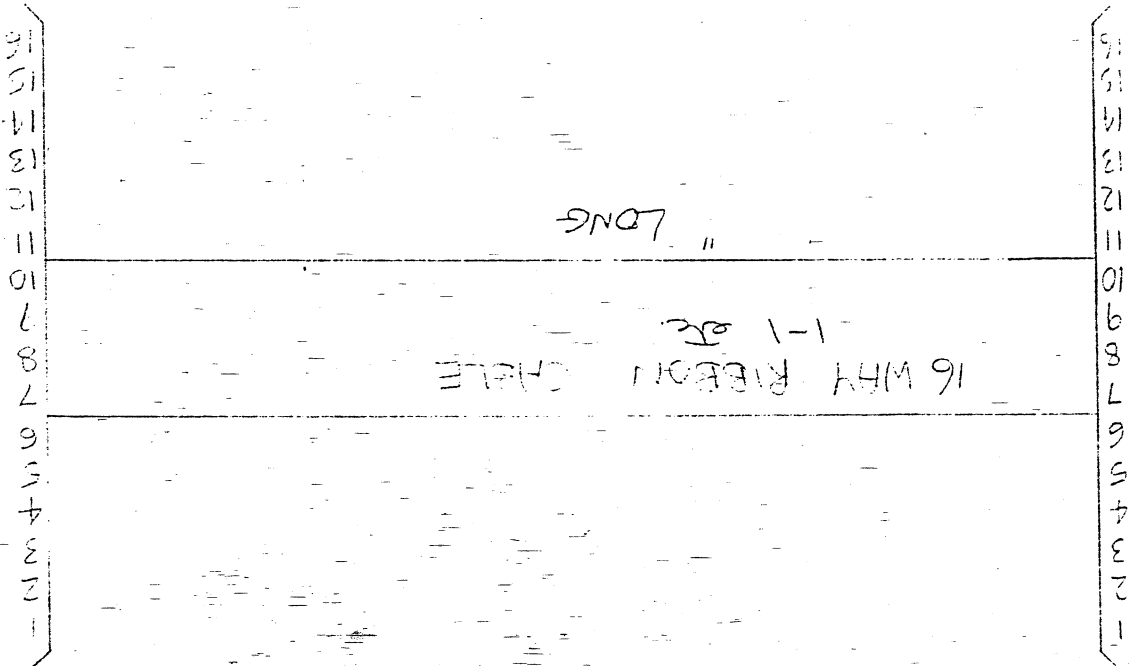
ON FREIGHT

INPUTS

ALL CHANGES 7/6/2

16W 0.1 1172 FOR HEADS

16W 1DC SOCKET
DRIVE SIGNALS



COLLECTOR XII - STREET 7 OF 12

9/10/87 13504-3 RTA 1

DAIRY

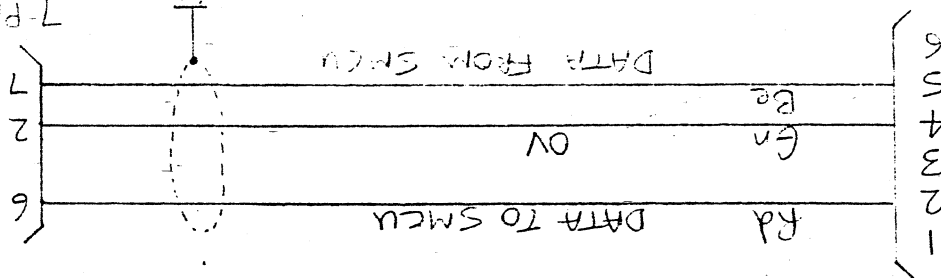
DELFORD TOOL CHANGER

4/7/27 ISSUE 3 REV 1

CONNECTOR XII2 SHEET 8 OF 18

6 WAY
MOLEX

RN



4 CORE SCREENSC
CABLE

KS232
PORT

(MOUNTED ON REVERSE OF FACE)

NOTE NOT USED OR FITTED ON FANUC ATCS

DENFORD SMCU TOOLCHANGER

CONNECTOR X14 WIRING

SHEET 9 OF 18

ISSUE 3 REV 1

12/10/87

10 WAY MOLEX

PIN

1				
2				
3	Yw	-Y O/T		4
4	Rd	-X O/T		2
5	Gn	+Y O/T		5
6	Or	+X O/T		3
7	Vt	+Z O/T		7
8	Be	-Z O/T		6
9				
10	Bn	OVI		1

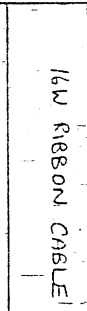
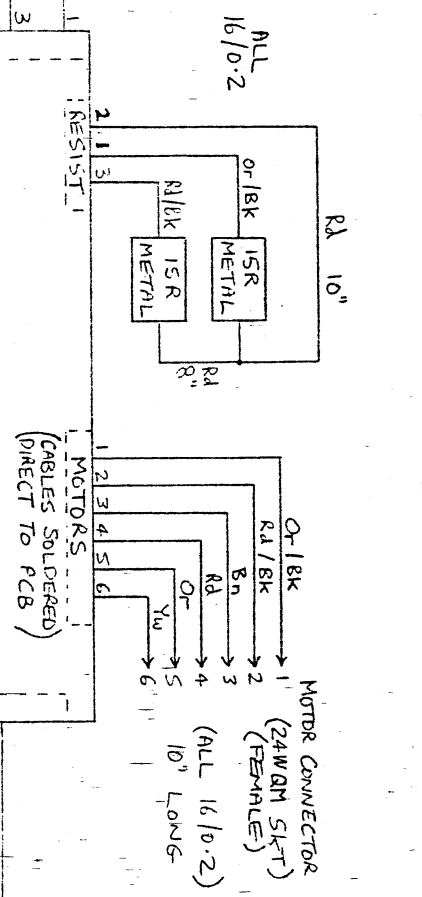
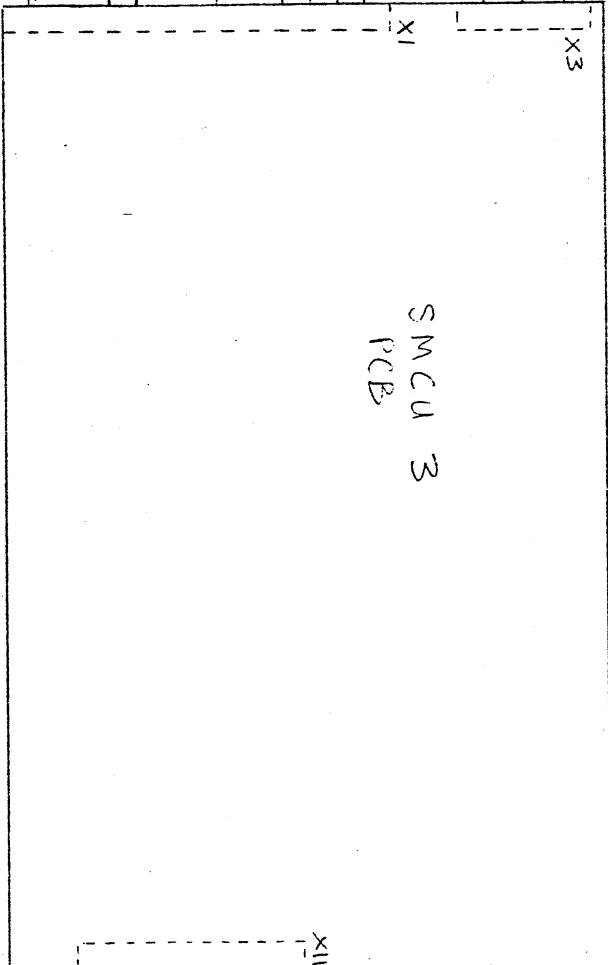
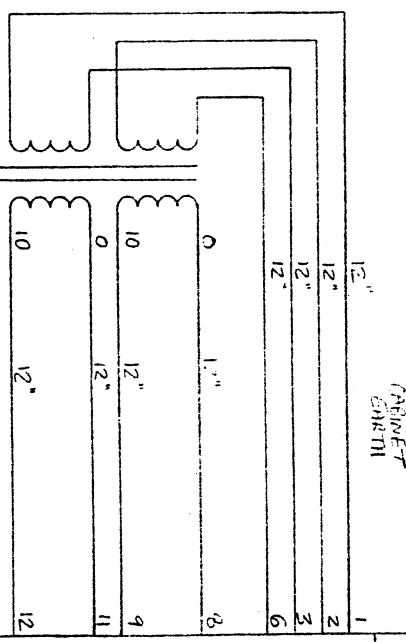
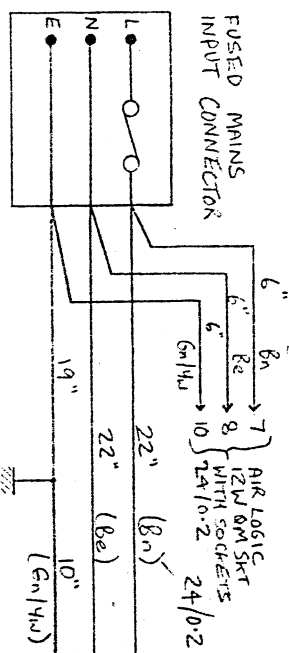
X14

LENGTH = 20"

16/0.2

12W QM CHASSIS
SKT WITH PINS

CABLE FOR FANUC CONTROL SYSTEMS ONLY.



SMCU TOOLCHANGER
POWER DISTRIBUTION
SHEET 17 OF 18
12/10/87 VER 1.3

6" 16/0-2
6" 16/0-2
6" 16/0-2

REV 1

MOTOR CONNECTOR - 24W QM SKT. (FEMALE)

PIN	SIGNAL	SOURCE IN ATC	
1	MOTOR SUPPLY	MOTORS' PIN 1 ON PSU BOARD	10" (Or/Bk)
2	MOTOR SUPPLY	" " 2 " " "	10" (Rd/Bk)
3	MOTOR PHASE 2A	" " 3 " " "	10" (Bn)
4	MOTOR PHASE 2B	" " 4 " " "	10" (Rd)
5	MOTOR PHASE 1B	" " 5 " " "	10" (Or)
6	MOTOR PHASE 1A	" " 6 " " "	10" (Yw)
7	X DATUM	X9 - PIN 2	16" (Bn)
8	DATUM COMMON	X9 - PIN 7 / 49VI	16" (Be)
9	ARM OUT SWITCH	X10 - PIN 3 / INPUT 1	16" (Or)
10	ARM IN SWITCH	X10 - PIN 6 / INPUT 2	16" (Be)
11	ARM DOWN SWITCH	X10 - PIN 4 / INPUT 3	16" (Yw)
12	ARM UP SWITCH	X10 - PIN 5 / INPUT 4	16" (Gn)
13	SWITCH COMMON	X10 - PIN 1 / OVI	16" (Bn)
14	T DATUM	X9 - PIN 3	16" (Wt)
15	EARTH		6" (Gn/Yw)
16			
17			
18			
19			
20			
21			
22			
23			
24			

LOGIC CONNECTOR - 12W QM SKT (FEMALE)

PIN	SIGNAL	SOURCE IN ATC	
1	IN SOLENOID COM.	X8 - PIN 6 (AUX 1 COM)	16" (Be)
2			
3	IN SOLENOID	X8 - PIN 3 (AUX 1 N/O)	16" (Or)
4	DOWN SOLENOID COM	X8 - PIN 7 (AUX 4 COM)	16" (Vt)
5			
6	DOWN SOLENOID	X8 - PIN 8 (AUX 4 N/O)	16" (Gy)
7	LIVE	IEC MAINS CONNECTOR	6" (Bn)
8	NEUTRAL	"	6" (Be)
9	DRAW BAR	X2 - PIN 1	18" (Or/Rd)
10	EARTH	IEC MAINS CONNECTOR	6" (Gn/Yw)
11	DRAW BAR	X2 - PIN 3	18" (Pk)
12			

FANUC CONTROL CONN. - 12W QM SKT (MALE)

PIN	SIGNAL	SOURCE IN ATC	
1	COMMON	X14 - PIN 10 - OVI	20" (Bn)
2	COMMAND BIT 0	X14 - PIN 4 (-X C/T)	20" (Rd)
3	COMMAND BIT 1	X14 - PIN 6 (+X C/T)	20" (Or)
4	COMMAND BIT 2	X14 - PIN 5 (-Y O/T)	20" (Yw)
5	COMMAND BIT 3	X14 - PIN 5 (+Y C/T)	20" (Gn)
6	DATUM	X14 - PIN 8 (-Z C/T)	20" (Be)
7	COMMAND STROBE	X14 - PIN 7 (+Z O/T)	20" (Vt)
8	STOP COMMON	QMS ON PSU BOARD	10" (Gy)
9	STOP	QMA ON PSU BOARD	10" (Wt)
10	FAULT	X2 - PIN 8 (AUX 6 N/O)	20" (Bk)
11	READY	X2 - PIN 5 (AUX 5 N/O)	20" (Rd)
12	COMMON	X2 - PIN 4 (AUX 5 COM)	20" (Gn)

RS232 LINK 7 PIN DIN SKT.

PIN	SIGNAL	SOURCE IN ATC	
1			
2	OV	X12 - PIN 4	10" (Gn)
3			
4			
5			
6	DATA TO SMCU	X12 - PIN 2	10" (Rd)
7	DATA FROM SMCU	X12 - PIN 5	10" (Be)

TRIAC CONNECTOR 5 PIN DIN SKT (60°)

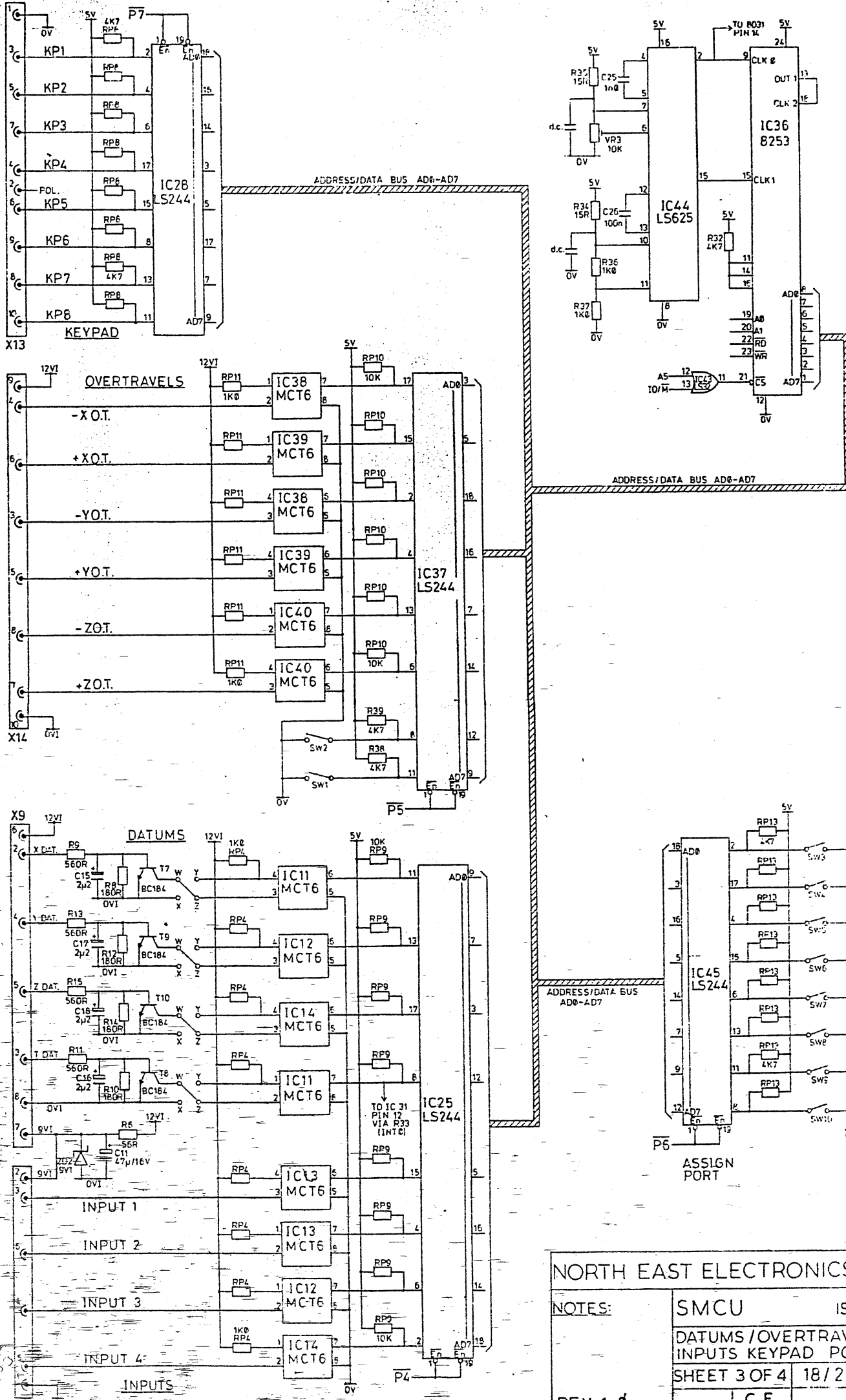
PIN	SIGNAL	SOURCE IN ATC	
1	READY	X2 - PIN 5 (AUX 5 N/O)	20" (Rd)
2	COMMON	X2 - PIN 4 (AUX 5 COM)	20" (Gn)
3			
4			
5	ERROR	X2 - PIN 8 (AUX 6 N/O)	20" (Bk)

NOTE - TRIAC - ATC'S HAVE TWO DIN SOCKETS FITTED AS ABOVE, FANUC ATC'S HAVE NO DIN SOCKETS AND INSTEAD HAVE THE FANUC CONNECTOR (LEFT) FITTED

NORTH EAST ELECTRONICS LTD.

NOTES:	SMCU TOOLCHANGER
	CONNECTOR PINNING
ISSUE 3	SHEET 18 OF 18 7/9/87
REV. 1	C.E.

CHKD:18/2/8



NORTH EAST ELECTRONICS LTD

NOTES:

SMCU

ISSUE 1

DATUMS / OVERTRAVELS /
INPUTS KEYPAD PORTS

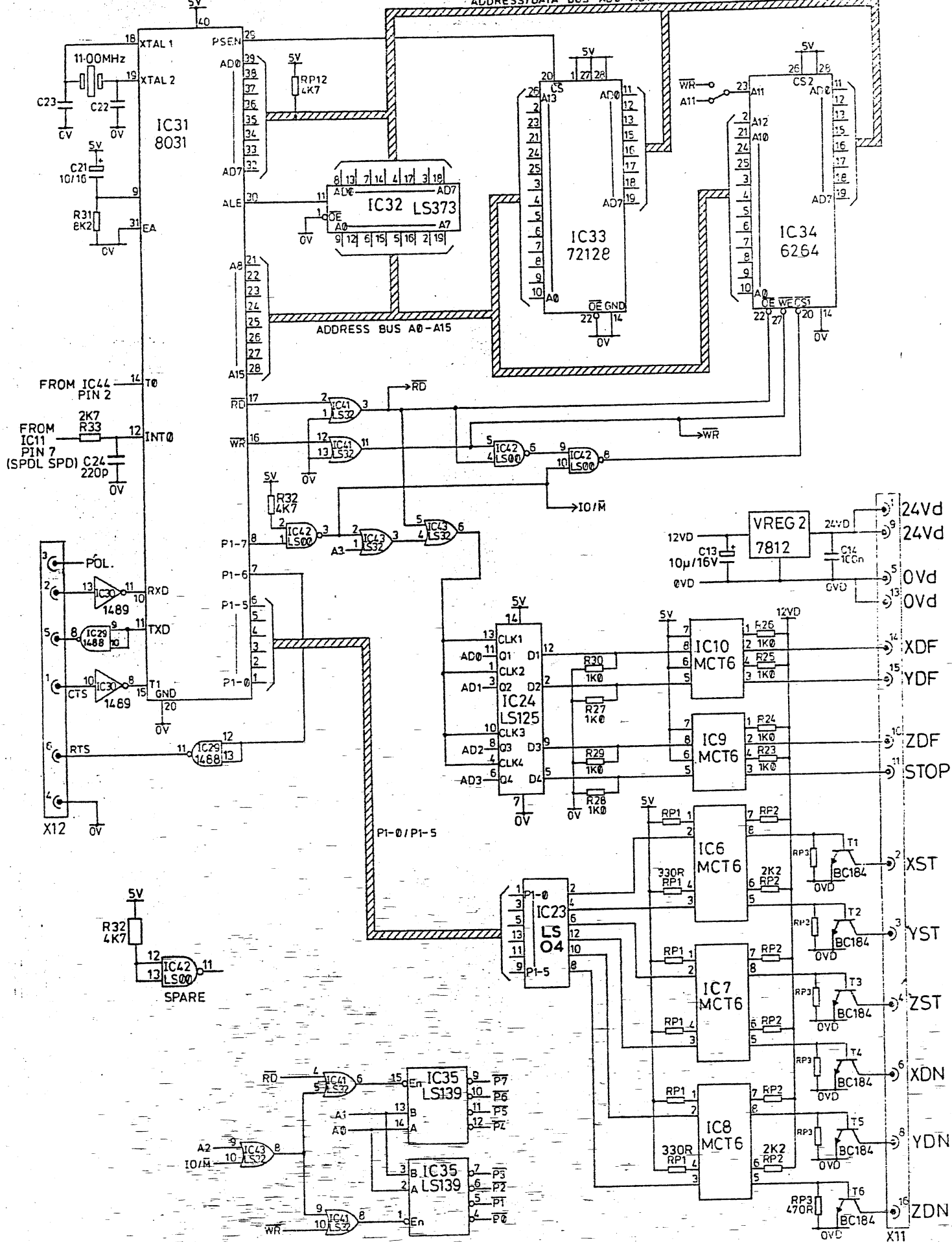
SHEET 3 OF 4 18/2/87

REV 1-0

C.E.



SMCU		ISSUE-1	
AUXILIARIES / SPINDLE SEC			
SHEET 2 OF 4		1 / 5 / 87	
C.E.		CHKD: 2/6/8	



NORTH EAST ELECTRONICS LTD.

NOTES: SMCU - ISSUE 1

PROCESSOR SECTION

SHEET 1 OF 4 18/7/87

REV 2 C E CHKD:18/2/87

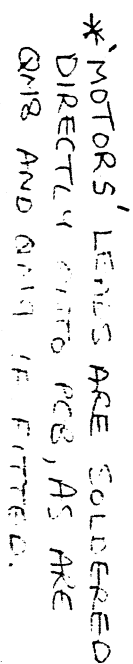
TITLE, TOOLCHANGER POWER SUPPLY
ISSUE 1

ISSUE 1

SCALE 2.1

22/10/87

T.P. LINK



DENFORD TOOL CHANGER

10/7/77

REV. 1.0

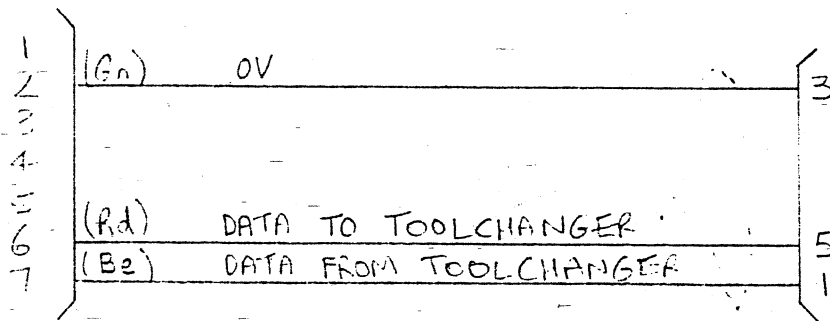
PS232 LINK (INTERCONNECTING LEAD)

TOOLCHANGER

7 PIN

TRAC

5 PIN



7 PIN DIN
SH-1

LENGTH 30"

5 PIN DIN
SH-1

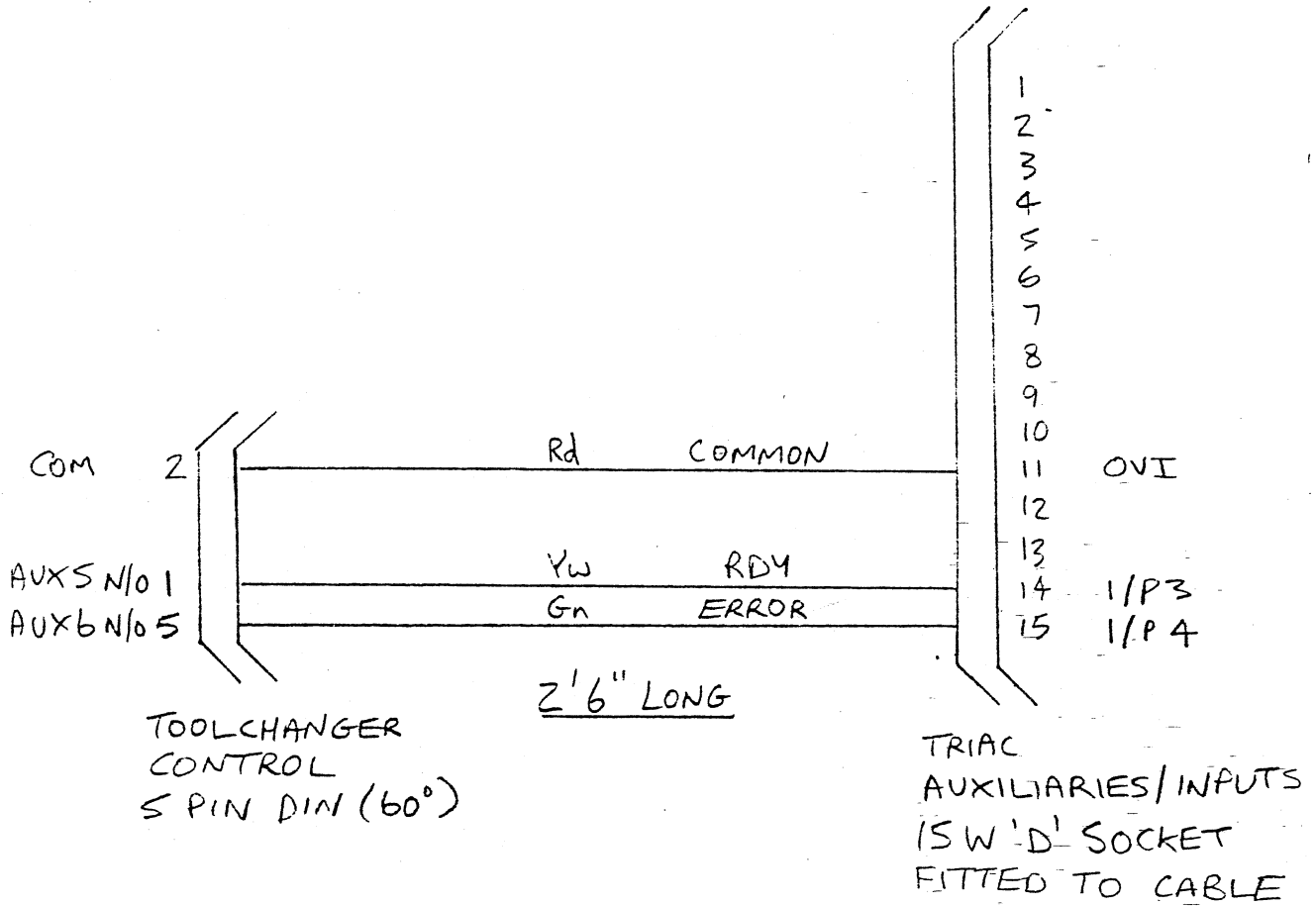
3 CORE SCREENED CABLE

TRAC - ATCS ONLY

DENFORD TOOLCHANGER

2/7/87

REV 1.1



TRIAC / TOOLCHANGER LINK

TRIAC JULY 86

Mods to fit TRIAC TOOLCHANGER system to TRIAC's with issue 2A main pcb's:-

Auxiliaries Section

1. Ensure RL5 is not fitted
2. Link IC4 pin 5 to track from RL5 to PLJ₅
3. Link R2 (P/S section) L.H.S. (OVI) to track from R15 to PLJ₆
4. Fit PLJ
5. Add 1K 1/4w resistor between PLJ₅ and PLJ₆ on relay base area.
6. Make conector: 5 pin DIN 60°
pin 3 to SKJ - 6
pin 5 to SKJ - 5
pin 2 POL