STUDIO MK 2

TECHNICAL MANUAL

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FOREWORD

1. The information contained in this service manual is applicable to the Studio Line Beverage Machine. Four versions of each type are available:

   Instant (INST)

   Single Fresh Brew Tea (SFBT)

   Double Fresh Brew (DFB)

   Single Fresh Brew Coffee (SFBC)

2. The machine described in this manual is the Studio Line SFBT version, which includes features of all models. Due to customer requirements, however, some features may vary from the one described, e.g. extras fitted, variations in programming etc.

3. Maintenance of the Beverage Machine must only be undertaken by personnel who are authorised and suitably qualified.

4. The Manufacturer reserves the right to make changes without notice to the design of the beverage machine, which may affect the information contained in this manual.

5. Outline Specification

   (a) Dimensions

Height	1830mm	(6”)
Depth	680 mm	(27”)
Width	700 mm	(27 ½ “)

   (b) Weight 100Kg (Hot only Versions)

   (d) Operating Environment

Temperature	1°C min - 40° max
Humidity	TBA max

   (f) Cup Capability

Quantity	600 cups
Sizes	70 and 73 mm diameter

   (f) Chiller Unit

Weight	20Kg
Refrigerant	R134A
Refrigerant Weight	

   (g) Carbonator Unit

Weight	26.5Kg
Refrigerant	R134A
Refrigerant Weight	155gms

SAFETY WARNINGS

1. Maintenance of the beverage machine is only to be undertaken by trained personnel who are fully aware of the dangers involved and who have taken adequate precautions, e.g. ensuring that, whenever possible, the beverage machine is isolated from the mains electrical supply.

2. Lethal voltages are exposed when any panel inside the cabinet is removed and the mains electrical supply is available (i.e. on/off switch is overridden). The mains electrical supply is maintained to the Carbonator even when the door is open.

3. The beverage machine must be earthed.

4. Keep clear of the Brewer Unit when it is indexing.

5. The beverage machine is a heavy item. Ensure that sufficient personnel are available for lifting and transporting the machine. Use proper lifting procedures and equipment.

6. The water in the heater tank, and the tank itself, are hot enough to scald or burn, even some time after the machine has been switched off. The water heater tank must be drained, filled with cold water and drained again before any attempt is made to handle it or any of its associated parts.

7. The Controller Board is fitted with a lithium battery. Abuse of this type of battery can lead to overheating, venting, explosion, release of potentially hazardous materials and spontaneous ignition.

   The lithium battery must not be charged or connected to any other source of power. The battery must not be short-circuited or forced to discharge its stored energy. The battery must not be subjected to physical damage or overheating. If the Controller Board is to be replaced, it must be handled with care, taking all practical anti-static precautions.

8. Care must be taken to protect the beverage machine from frost. Do not attempt to operate the machine if it becomes frozen. Contact the nearest service agent immediately. Do not restore the machine to operational use until it has been checked and approved for use by the service agent.

9. Young children, the aged and the infirm should not be allowed to operate the beverage machine unsupervised, in order to protect them from the risk of being scalded by hot beverages.

10. Replacement of the Type Y mains cable requires special tools. Should the cable become damaged, a trained person from an approved service agent must only carry out replacement.

Section 1

Technical Information

Introduction

1. The Studio Line consists of three types of coin-operated, microprocessor controlled, beverage machine that dispense a range of hot and cold drinks in response to keypad selections. The main difference between the models is the option of either Instant or Fresh Brew drinks with or without a chiller or carbonation unit.

2. Four versions of each model are available:

   - Instant (INST) - Instant Tea and Coffee
   - Single Fresh Brew Tea (SFBT) - Fresh Brew Tea and Instant Coffee
   - Double Fresh Brew (DFB) - Fresh Brew Tea and Coffee
   - Single Fresh Brew Coffee (SFBC) – Instant Tea and Fresh Brew Coffee

3. This manual uses the SFBT version as the basis for examples. Where significant differences between versions exist this will be highlighted in main body of the document. Due to customer requirements, however, some features may vary from those described, e.g. extras fitted, variations in programming etc.

4. Three options are available to add a cold drinks capability to machines in the Studio range. An optional chiller allows the addition of a cold-water selection. A chiller incorporating a pair of syrup pumps allows for the addition of two flavoured cold drinks, whilst a carbonator provides the option of two flavours of still and carbonated drinks in addition to cold water.

5. Cups from a cup drop mechanism are dispensed to contain the drinks. However, a key-operated jug facility is also provided.

6. Selection is made on a 16 button keypad and a LCD display panel shows status and drink selection information.

7. The status of the machine may be monitored, and the configuration altered, by accessing a menu of program options using both internal and external keypads. Each option comprises a number of sub-options, the settings of which can be altered.

8. A feature of the Studio Line beverage machines is the mobile dispense head which moves the head to a parked position away from the cup port after each drink is vended, preventing the possibility of any residue from the previous drink dripping into the next one. The dispense head is fitted with two groups of nozzles, one for hot drinks and one for cold. Upon selection, the required group is moved into place above the cup port.

9. The Studio Line machines require a single-phase 240V electrical mains supply from a domestic 13A outlet, and a cold water supply from the domestic cold water main. These services enter the machine at the rear of the cabinet.

GENERAL DESCRIPTION

10. The operational components which form a Studio Line beverage machine are housed in a metal enclosure, access to which is gained by a swivel door secured by a key operated locking mechanism. Turning the key in the lock releases a door handle, which allows a three point locking mechanism to move to the unlocked state and the door to be opened. With the door open the mains isolation switch for ON/OFF operation of the machine is visible in the top left corner of the machine.

11. Equipment inside the cabinet is arranged in two sections: front and rear. On opening the door, the Operator is immediately faced with those items of equipment to which he or she requires access, e.g. Ingredient Canisters, Cup Turrets, Coin Mechanism, CO_2 Bottle, Waste Trays, etc. The remaining items of equipment, e.g. Water Heater, Valves, Electrical and Electronic components, etc, to which specifically the Engineer requires access (and from which the Operator must be shielded) are located behind the Ingredient Canisters and Whipper Motor and Dispense Head Assembly panel, at the rear of the cabinet.

CABINET FRONT

12. The Cup Drop Assembly, Coin Mechanism, Controller Board and Cup Station are fitted to the rear of the cabinet door. The Customer's keypad is fitted to the front panel and is connected to the Controller board via a cable assembly.

13. Ingredient canisters are located on a shelf approximately half way up the cabinet. At the front of the shelf is a duct assembly to which an extractor fan is connected. The fan pulls air from the extract duct, which in turn removes steam/moist air from the mixing systems, which are located on a vertical panel below the canister shelf. The moving dispense head protrudes through and is fastened to this vertical panel and in the case of the fresh brew versions this vertical panel also provides the mounting for the fresh brew units.

14. If fitted, the optional cold drinks unit is located in the lower left hand corner of the cabinet. In the case of a carbonated unit the CO_2 cylinder is placed in the lower right hand corner of the cabinet with the two syrup containers at its side. A gas regulator with associated pressure gauge is fitted to the CO_2 cylinder in addition to an ordinary cylinder pressure gauge. The regulator is set to give an output pressure of 50 psi

15. On the fresh brew versions a large plastic waste bucket is located underneath the Brewer Unit(s), in addition to the smaller one placed at the front of the cabinet, beneath the Cup Station (when the door is closed). Water heater and Carbonator overflow pipes, and a waste level probe, are directed into the smaller bucket. When the waste liquid in the bucket reaches the level sensor probe, the water supply inlet is shut off and the machine is rendered inoperable.

CABINET REAR

16. Access to the components and equipment in the rear section of the cabinet is obtained by removing the ingredient canisters and the relevant back panel.

17. Cold water mains supply enters the cabinet through an aperture in the rear panel and connects to a twin chamber inlet valve for the hot water supply. There is also a similar twin chamber inlet valve dedicated to the cold water supply. This is fitted only in the case where a cold drinks system is required.

18. A length of tubing takes the water supply from the inlet valve into the water heater tank, located at the top of the cabinet. Hot water in the correct quantity is then directed from the tank to the appropriate mixing bowl via a solenoid operated dispense valve. A dispense valve is associated with each ingredient. Any overflow from the tank is directed into the waste bucket via an overflow tube. Fitted to this tube is a high temperature cut-out (or two cut-outs, depending on the model) which, when operated, cuts off the electrical supply to the heater in the tank. The cut-out must then be reset to restore the supply. Another length of tubing facilitates draining of the heater.

19. The Carbonator is provided with three inputs: cold water from the inlet valve; two types of syrup, pumped from the syrup containers; and carbon dioxide from the $C0_2$ cylinder. Still or carbonated water and syrup are taken from the Carbonator, via separate tubes, to the dispense head.

20. A level probe is fitted to the rear of the cabinet door and a similar device is located in the Freshbrew waste container. When the door is closed these devices act as contact probes allowing the units control system to monitor the liquid level in the waste containers.

21. Two printed circuit boards are fitted to the top right hand side of the cabinet rear panel; the DC Remote Input/Output Board (DC RIO) and the Power Supply Unit (PSU). The DC RIO Board provides the high current drives to operate the output devices (valves, motors etc) in response to signals from the Controller Board.

22. A solid-state relay, located beneath the printed circuit boards, pulses current to the heater in response to signals from the DC RIO Board. The DC RIO board receives signal from the Controller board via an I squared C link. The temperature of the water in the boiler is measured by the Controller Board using an NTC thermistor mounted at the end of a stainless steel probe immersed in the hotwater tank.

WATER SYSTEM

23. The cold water mains supply enters the machine via a double-solenoid operated inlet valve at the rear of the cabinet. This valve controls the flow of water to the units hotwater tank. If an optional cold drink system is fitted a separate inlet valve is used to connect it to the mains water supply. In this eventuality a special 'Y' shaped mains water supply hose is required.

HOT WATER SYSTEM

24. Water is supplied via the Hot Inlet valve to the heater tank where it is heated to the required temperature by a heating element in the tank. Water temperature is controlled by a combined temperature and level probe assembly in the tank which causes the supply to the heater to be removed when the preset temperature is reached. The probe assembly also acts as a level sensor, causing the Hot Inlet valve to open when the water in the tank falls below a preset level. The probe (i.e. the input device) is monitored by the Controller Board, and the water heater and Hot Inlet valve (i.e. the output devices) are controlled by the DC RIO Board in response to signals from the Controller Board.

25. Depending on the type of hot drink selected, hot water from the heater tank is fed via solenoid operated dispense valves to the appropriate mixing bowl or Brewer Unit container. Ingredients and water are mixed in exact quantities in the mixing bowl and then directed to the dispense head. Similarly, water and ingredient are brewed in exact amounts in the Brewer Unit and then directed to the dispense head.

26. A resettable cut-out sensor, mounted on the boiler lid, cuts off the electrical supply to the tank heater circuit if the water in the tank starts to boil. Additionally, if the fluid level in the overflow waste bucket rises above a preset level, it is detected by a level probe and reported to the Controller Board, which responds by closing the inlet valve via the DC RIO Board and rendering the machine inoperable.

COLD WATER SYSTEM

28. Water is supplied from the Cold Inlet valve to the chiller or carbonator unit, (if fitted), via a pressure regulator. The chiller/carbonator provides either cold still water or cold carbonated water (carbonator only). The selected type of water (still or carbonated) is controlled by solenoid operated dispense valves. Flavoured syrup if available is added to the drink by means of oscillating pumps.

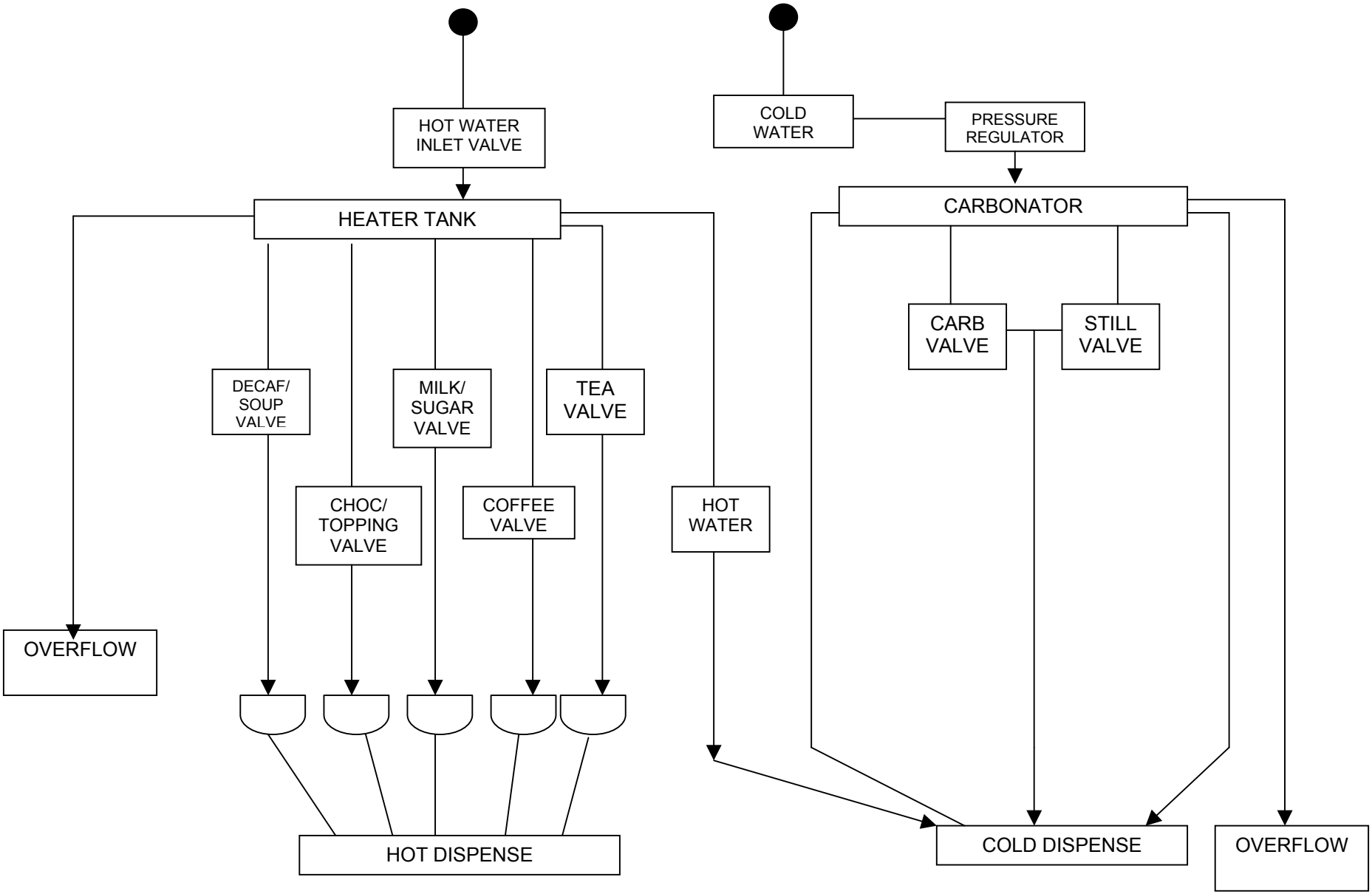


FIG 1.1 A WATER SYSTEM DIAGRAM INSTANT

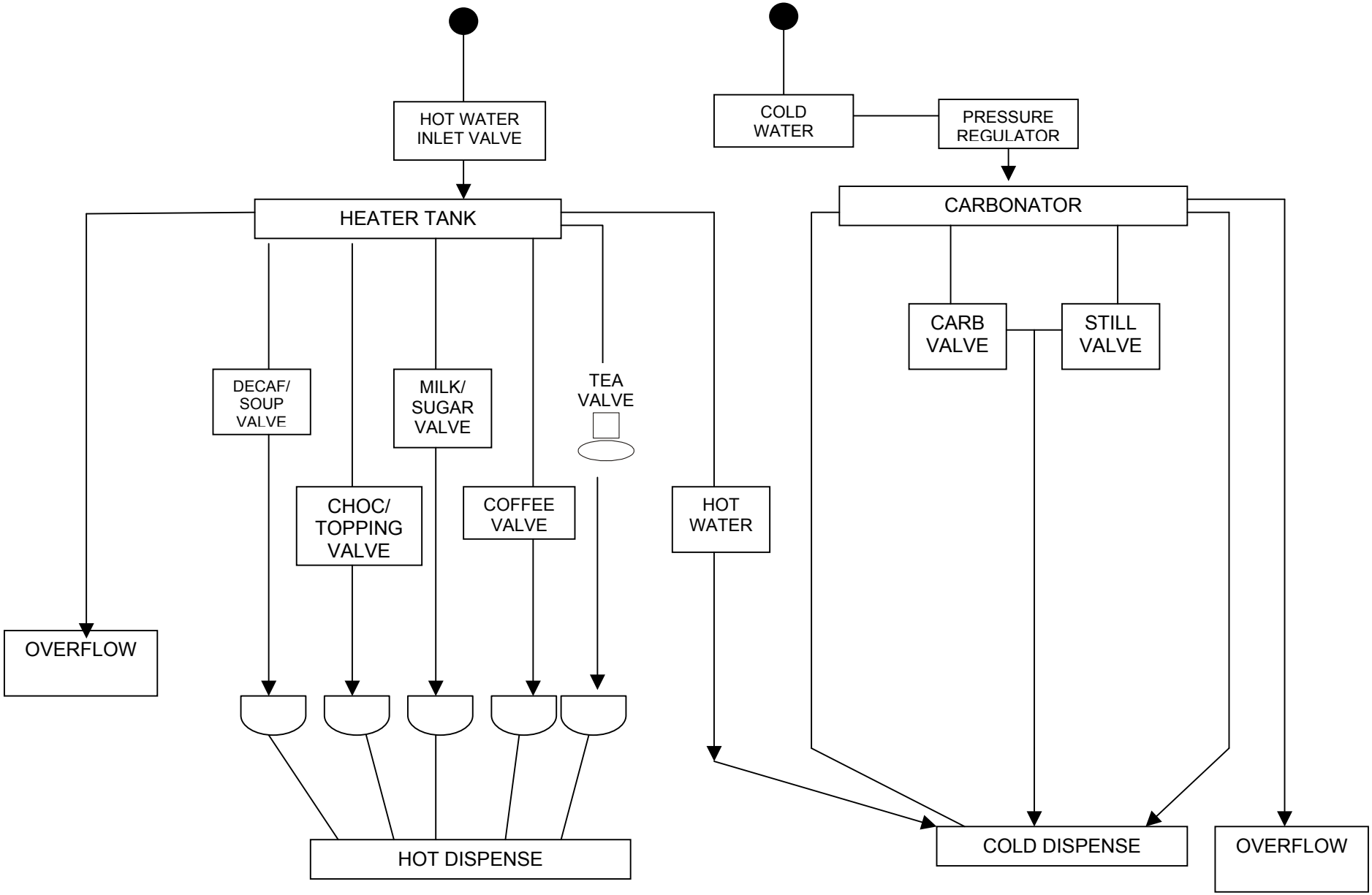


FIG 1.1 B WATER SYSTEM FUNCTIONAL DIAGRAM SINGLE FRESH BREW TEA

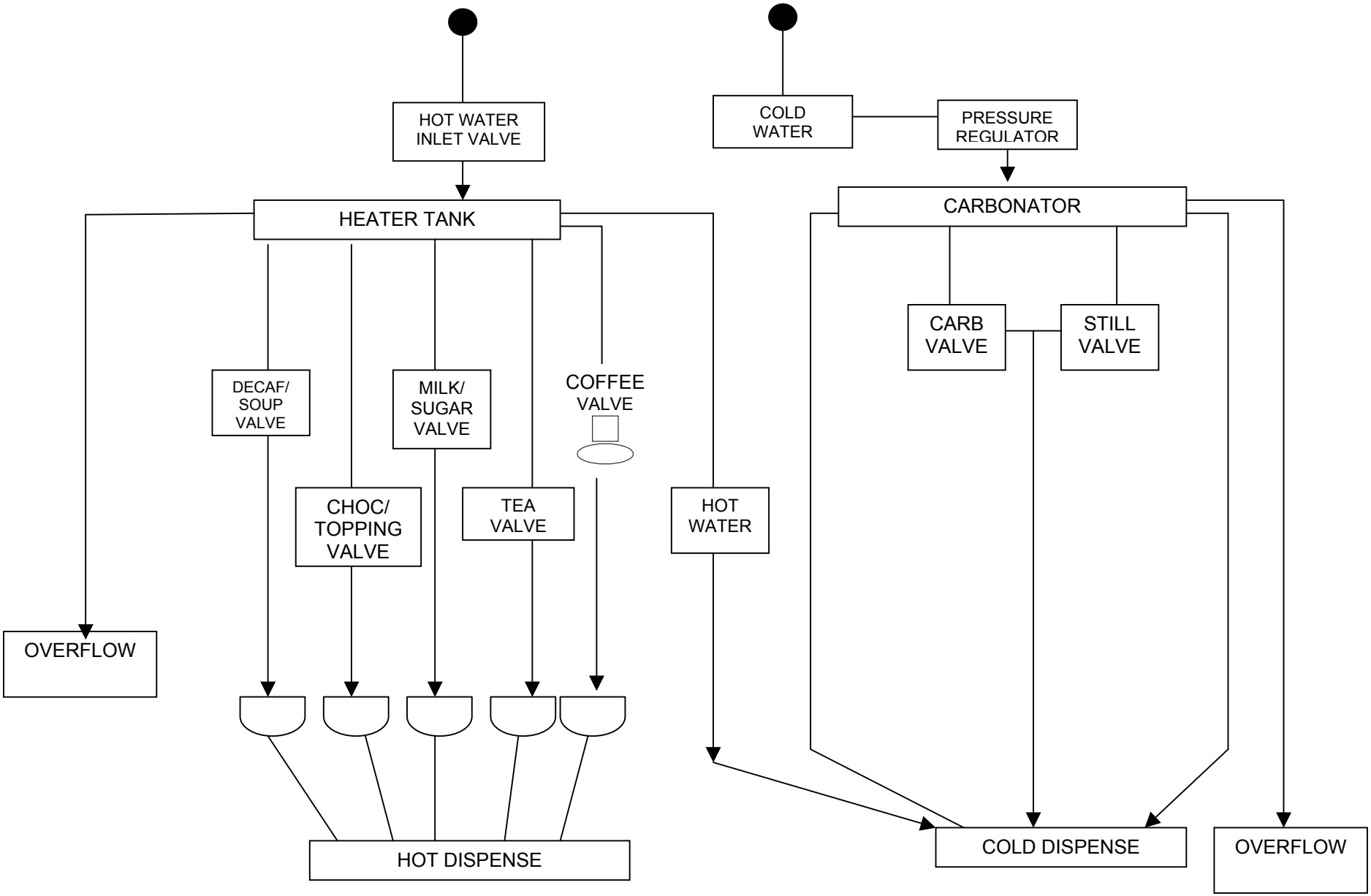


FIG 1.1 C WATER SYSTEM FUNCTIONAL DIAGRAM SINGLE FRESH BREW COFFEE

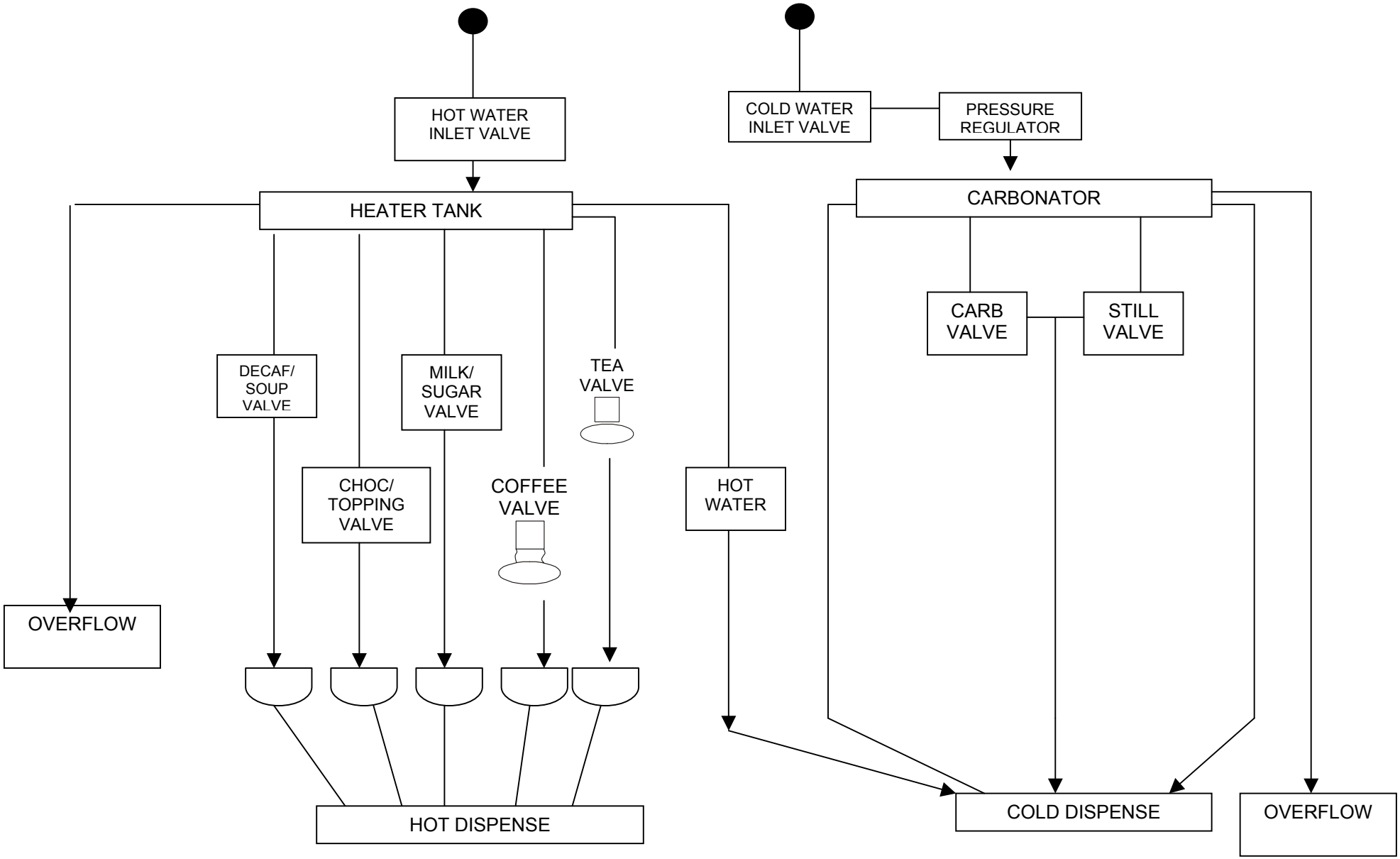
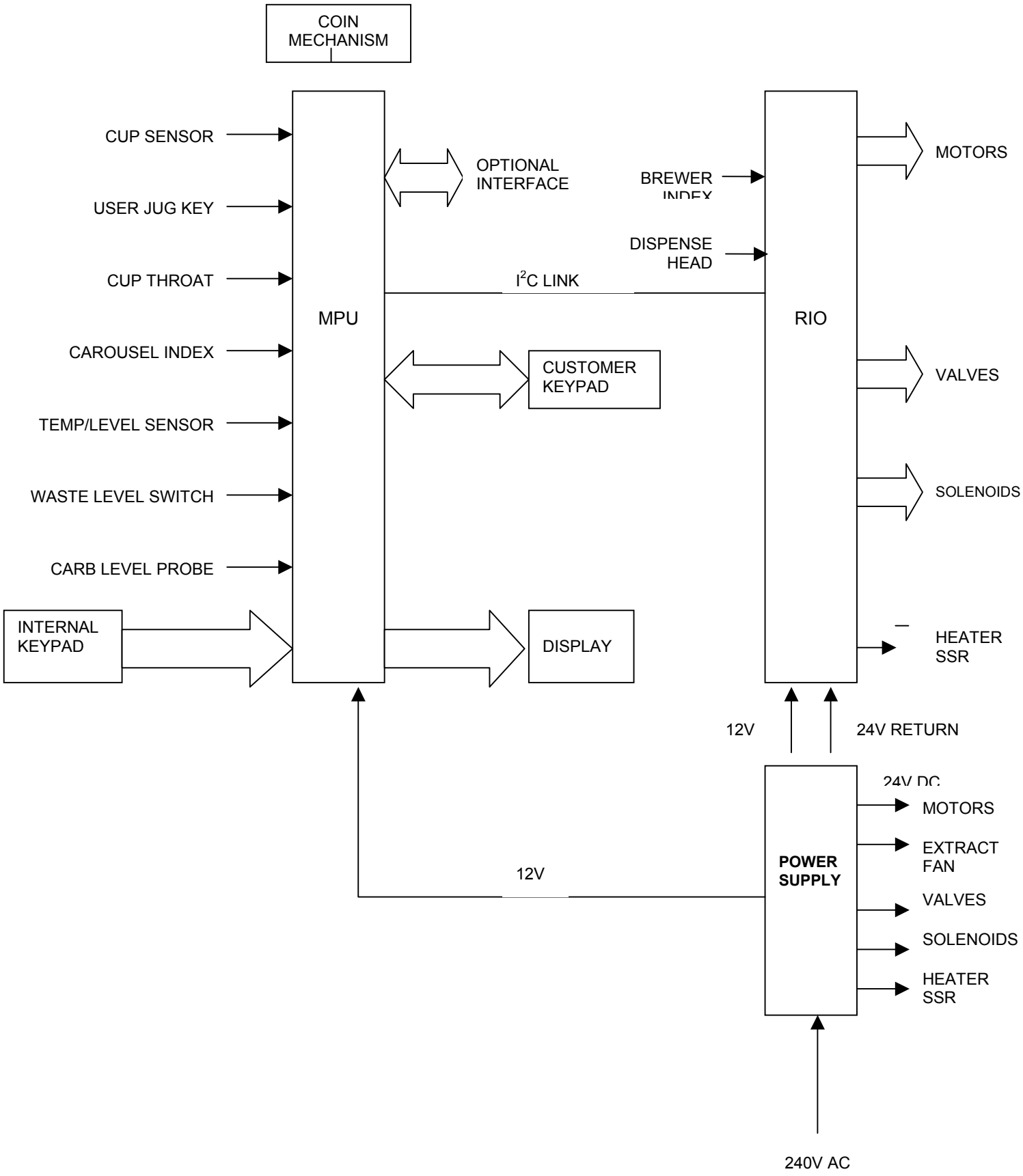
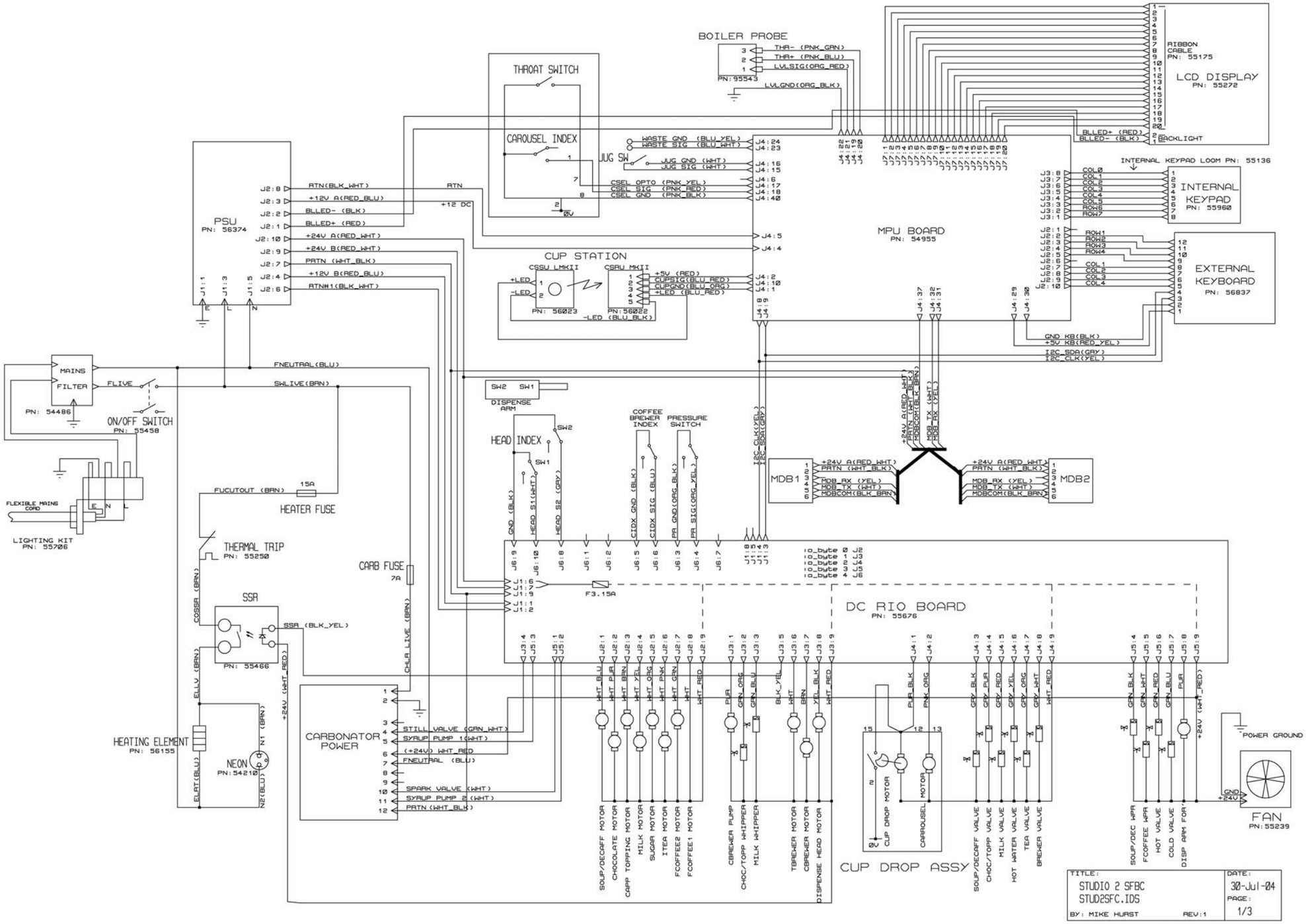


FIG 1.1 D WATER SYSTEM FUNCTIONAL DIAGRAM DOUBLE FRESH BREW AND BEAN TO CUP

FIG 1.2 ELECTRICAL & ELECTRONIC SYSTEM – FUNCTIONAL DIAGRAM




BOILER PROBE
THR- (PNK_GRN)
THR+ (PNK_BLU)
LVLSIG(ORG_RED)
LVLGND(ORG_BLK)
PN: 55543
THROAT SWITCH
CAROUSEL INDEX
JUG SW
WASTE GND (BLU_YEL)
WASTE SIG (BLU_WHT)
JUG GND (WHT)
JUG SIG (WHT)
CSEL OPTO (PNK_YEL)
CSEL SIG (PNK_RED)
CSEL GND (PNK_BLK)
RIBBON CABLE PN: 55175
LCD DISPLAY PN: 55272
BLLED+ (RED)
BLLED- (BLK)
BACKLIGHT
INTERNAL KEYPAD LOOM PN: 55136
INTERNAL KEYPAD PN: 55960
COL0
COL1
COL2
COL3
COL4
COL5
ROW5
ROW7
PSU PN: 56374
RTN(BLK_WHT)
+12V A(RED_BLU)
BLLED- (BLK)
BLLED+ (RED)
+24V A(RED_WHT)
+24V B(RED_WHT)
PATN (WHT_BLK)
+12V B(RED_BLU)
RTNM1(BLK_WHT)
RTN
+12 DC
MPU BOARD PN: 54955
ROW1
ROW2
ROW3
ROW4
COL1
COL2
COL3
COL4
EXTERNAL KEYBOARD PN: 56837
GND KB(BLK)
+5V KB(RED_YEL)
I2C SDA(GRY)
I2C CLK(YEL)
CUP STATION
CSSU LMKII
CSAU MKII
+5V (RED)
CUPSIG(BLU_RED)
CUPGND(BLU_ORG)
+LED (BLU_RED)
-LED (BLU_BLK)
PN: 56023
PN: 56022
MAINS FILTER
PN: 54486
FLIVE
SWLIVE(BRN)
FNEUTRAL(BLU)
ON/OFF SWITCH PN: 55458
FLEXIBLE MAINS CORD
LIGHTING KIT PN: 55706
SW2 SW1
DISPENSE ARM
HEAD INDEX
COFFEE BREWER INDEX
PRESSURE SWITCH
GND (BLK)
HEAD S1(WHT)
HEAD S2 (GRY)
CIDX GND (BLK)
CIDX SIG (BLU)
PA GND(ORG_BLK)
PA SIG(ORG_YEL)
I2C CLK(YEL)
I2C SDA(GRY)
MDB1
MDB2
+24V A(RED_WHT)
PATN (WHT_BLK)
MDB_RX (YEL)
MDB_TX (WHT)
MDBCOM(BLK_BRN)
FUCUTOUT (BRN)
15A
HEATER FUSE
THERMAL TRIP PN: 55250
CARB FUSE 7A
F3.15A
SSR
SSR (BLK_YEL)
PN: 55466
COSSR (BRN)
ELLV (BRN)
ELLT(BLU)
+24V (WHT_RED)
CHLR LIVE (BRN)
HEATING ELEMENT PN: 56155
NEON PN: 54210
N1 (BRN)
N2(BLU)
DC RIO BOARD PN: 55676
CARBONATOR POWER
STILL VALVE (GRN_WHT)
SYRUP PUMP 1(WHT)
(+24V) WHT_RED
FNEUTRAL (BLU)
SPARK VALVE (WHT)
SYRUP PUMP 2 (WHT)
PATN (WHT_BLK)
SOUP/DECAFF MOTOR
CHOCOLATE MOTOR
CAPP TOPPING MOTOR
MILK MOTOR
SUGAR MOTOR
ITEA MOTOR
FCOFFEE2 MOTOR
FCOFFEE1 MOTOR
CBREKER PUMP
CHOC/TOPP WHIPPER
MILK WHIPPER
TBREWER MOTOR
CBREWER MOTOR
DISPENSE HEAD MOTOR
CUP DROP MOTOR
CARROUSEL MOTOR
CUP DROP ASSY
SOUP/DECAFF VALVE
CHOC/TOPP VALVE
MILK VALVE
HOT WATER VALVE
TEA VALVE
BREWER VALVE
SOUP/DEC WPR
FCOFFEE WPR
HOT VALVE
COLD VALVE
DISP ARM FOR
POWER GROUND
GND
+24V
FAN PN: 55239
TITLE:
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STUD2SFC.IDS
BY: MIKE HURST
REV:1
DATE:
30-Jul-04
PAGE:
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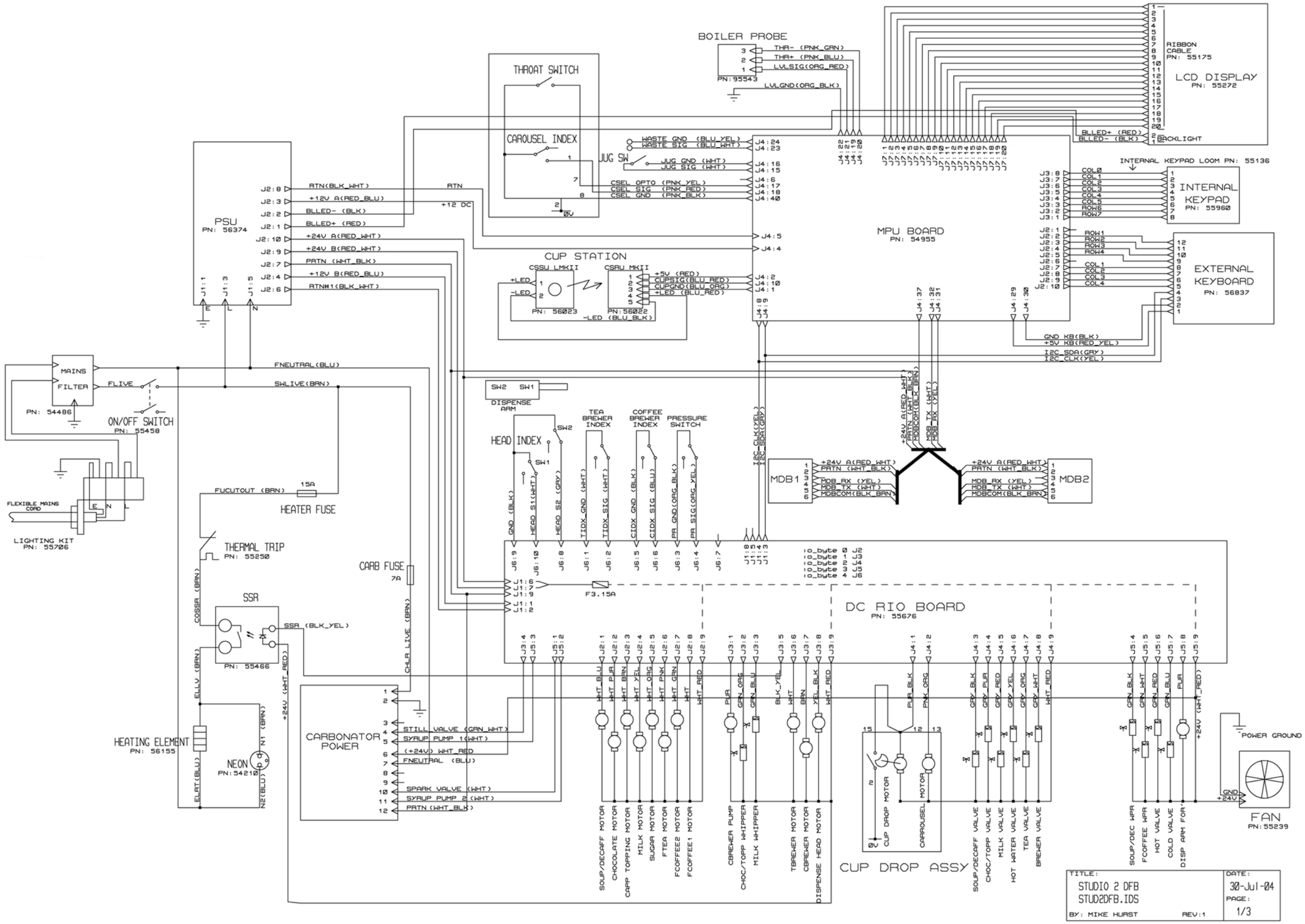
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JUG SIG (WHT)
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CSEL SIG (PNK_RED)
CSEL GND (PNK_BLK)
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BACKLIGHT
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INTERNAL KEYPAD PN: 55960
EXTERNAL KEYBOARD PN: 56837
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+5V KB(RED_YEL)
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RTN(BLK_WHT)
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CSSU LMKII
CSSU MKII
+LED
-LED
PN: 56023
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COFFEE BREWER INDEX
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GND (BLK)
HEAD S1(WHT)
HEAD S2 (GRY)
TIDX GND (WHT)
TIDX SIG (WHT)
CIDX GND (BLK)
CIDX SIG (BLU)
PR GND(ORG_BLK)
PR SIG(ORG_YEL)
I2C CLK(YEL)
I2C SDA(GRY)
MDB1
MDB2
+24V A(RED_WHT)
PRTN (WHT_BLK)
MDB RX (YEL)
MDB TX (WHT)
MDBCOM(BLK_BRN)
F3.15A
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CHOCOLATE MOTOR
CAPP TOPPING MOTOR
MILK MOTOR
SUGAR MOTOR
FTEA MOTOR
FCOFFEE2 MOTOR
FCOFFEE1 MOTOR
CBREWER PUMP
CHOC/TOPP WHIPPER
MILK WHIPPER
TBREWER MOTOR
CBREWER MOTOR
DISPENSE HEAD MOTOR
CUP DROP MOTOR
CARROUSEL MOTOR
CUP DROP ASSY
SOUP/DECAFF VALVE
CHOC/TOPP VALVE
MILK VALVE
HOT WATER VALVE
TEA VALVE
BREWER VALVE
SOUP/DEC NPR
FCOFFEE NPR
HOT VALVE
COLD VALVE
DISP ARM FOR
POWER GROUND
GND
+24V
FAN PN: 55239
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BY: MIKE HURST
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30-Jul-04
PAGE:
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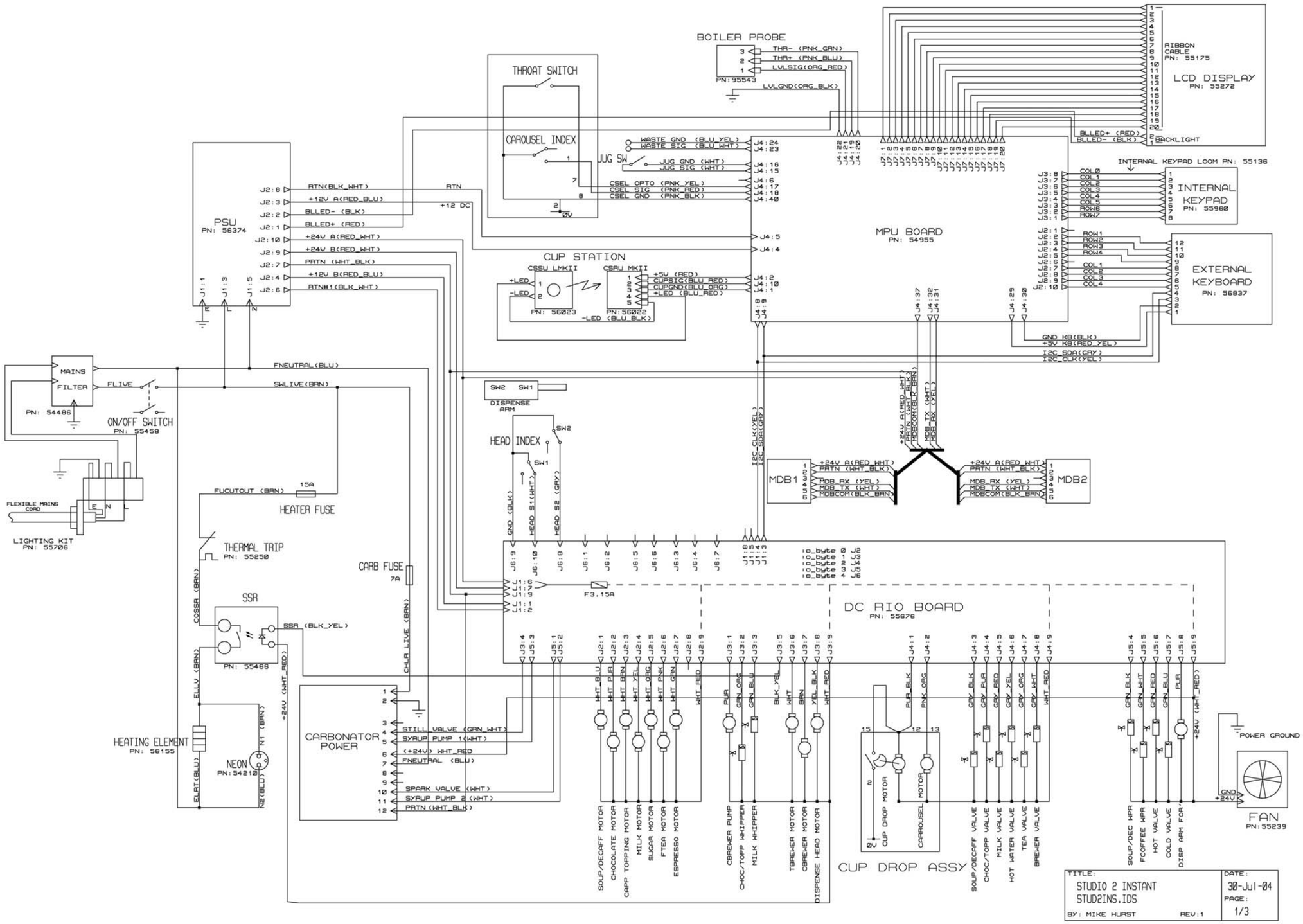
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THR+ (PNK_BLU)
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JUG SIG (WHT)
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CSEL SIG (PNK_RED)
CSEL GND (PNK_BLK)
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BLLED- (BLK)
BACKLIGHT
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INTERNAL KEYPAD PN: 55960
COL0
COL1
COL2
COL3
COL4
ROW6
ROW7
ROW1
ROW2
ROW3
ROW4
COL1
COL2
COL3
COL4
EXTERNAL KEYBOARD PN: 56837
GND KB(BLK)
+5V KB(RED_YEL)
I2C_SDA(GRY)
I2C_CLK(YEL)
PSU PN: 56374
RTN(BLK_WHT)
+12V A(RED_BLU)
BLLED- (BLK)
BLLED+ (RED)
+24V A(RED_WHT)
+24V B(RED_WHT)
PRTN (WHT_BLK)
+12V B(RED_BLU)
RTNH1(BLK_WHT)
RTN
+12 DC
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CUPGND(BLU_ORG)
+LED (BLU_RED)
-LED (BLU_BLK)
+LED
-LED
PN: 56023
PN:56022
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SWLIVE(BRN)
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FLEXIBLE MAINS CORD
LIGHTING KIT PN: 55706
SW2 SW1
DISPENSE ARM
HEAD INDEX
GND (BLK)
HEAD S1(WHT)
HEAD S2 (GRY)
I2C_CLK(YEL)
I2C_SDA(GRY)
MDB1
MDB2
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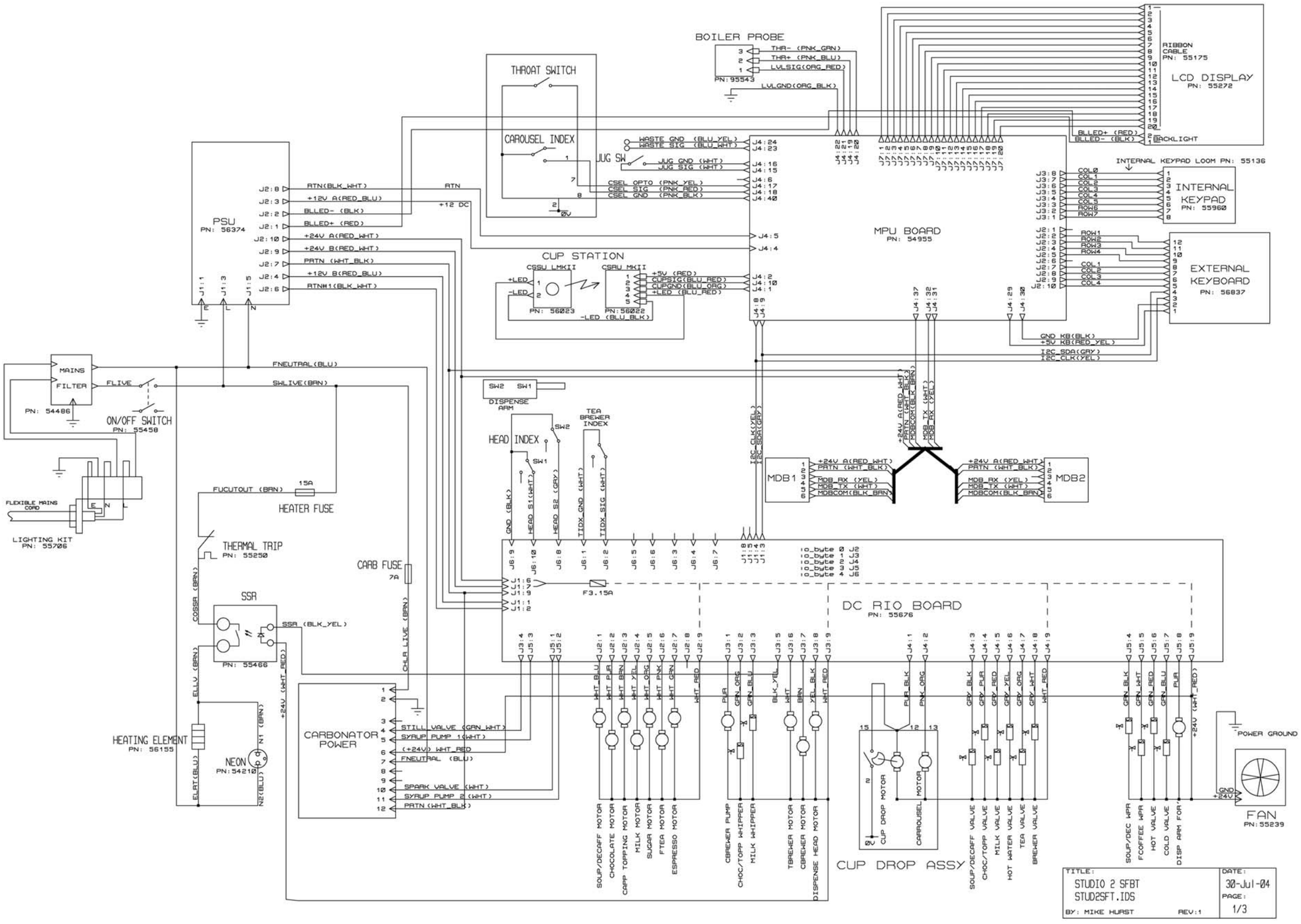
PRTN (WHT_BLK)
MDB_RX (YEL)
MDB_TX (WHT)
MDBCOM(BLK_BRN)
FUCUTOUT (BRN)
15A
HEATER FUSE
THERMAL TRIP PN: 55250
CARB FUSE 7A
F3.15A
SSR
PN: 55466
COSSR (BRN)
SSR (BLK_YEL)
CHA LIVE (BRN)
ELLV (BRN)
+24V (WHT_RED)
HEATING ELEMENT PN: 56155
NEON PN:54210
ELAT(BLU)
N2(BLU)
N1 (BRN)
CARBONATOR POWER
STILL VALVE (GRN_WHT)
SYRUP PUMP 1(WHT)
(+24V) WHT_RED
FNEUTRAL (BLU)
SPARK VALVE (WHT)
SYRUP PUMP 2(WHT)
PRTN (WHT_BLK)
DC RIO BOARD PN: 55676
SOUP/DECAFF MOTOR
CHOCOLATE MOTOR
CAPP TOPPING MOTOR
MILK MOTOR
SUGAR MOTOR
FTEA MOTOR
ESPRESSO MOTOR
CBREWER PUMP
CHOC/TOPP WHIPPER
MILK WHIPPER
TBREWER MOTOR
CBREWER MOTOR
DISPENSE HEAD MOTOR
CUP DROP MOTOR
CARROUSEL MOTOR
CUP DROP ASSY
SOUP/DECAFF VALVE
CHOC/TOPP VALVE
MILK VALVE
HOT WATER VALVE
TEA VALVE
BREWER VALVE
SOUP/DEC WPR
FCOFFEE WPR
HOT VALVE
COLD VALVE
DISP ARM FOR
POWER GROUND
FAN PN:55239
TITLE:
STUDIO 2 INSTANT
STUD2INS.IDS
BY: MIKE HURST
REV:1
DATE:
30-Jul-04
PAGE:
1/3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THR+ (PNK_BLU)
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JUG SIG (WHT)
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CSEL SIG (PNK_RED)
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LCD DISPLAY PN: 55272
BLLED+ (RED)
BLLED- (BLK)
BACKLIGHT
INTERNAL KEYPAD LOOM PN: 55136
INTERNAL KEYPAD PN: 55960
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COL1
COL2
COL3
COL4
ROW5
ROW6
ROW7
MPU BOARD PN: 54955
ROW1
ROW2
ROW3
ROW4
COL1
COL2
COL3
COL4
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BLLED- (BLK)
BLLED+ (RED)
+24V A(RED_WHT)
+24V B(RED_WHT)
PRTN (WHT_BLK)
+12V B(RED_BLU)
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RTN
+12 DC
CUP STATION
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CSSU MKII
+LED
-LED
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CUPSIG(BLU_RED)
CUPGND(BLU_ORG)
+LED (BLU_RED)
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PN: 54486
FLIVE
FNEUTRAL(BLU)
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ON/OFF SWITCH PN: 55458
FLEXIBLE MAINS CORD
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15A
HEATER FUSE
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HEAD INDEX
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BREWER VALVE
SOUP/DEC WPR
FCOFFEE WPR
HOT VALVE
COLD VALVE
DISP ARM FOR
POWER GROUND
GND
+24V
FAN PN:55239
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STUDIO 2 SFBT
STUD2SFT.IDS
BY: MIKE HURST
REV:1
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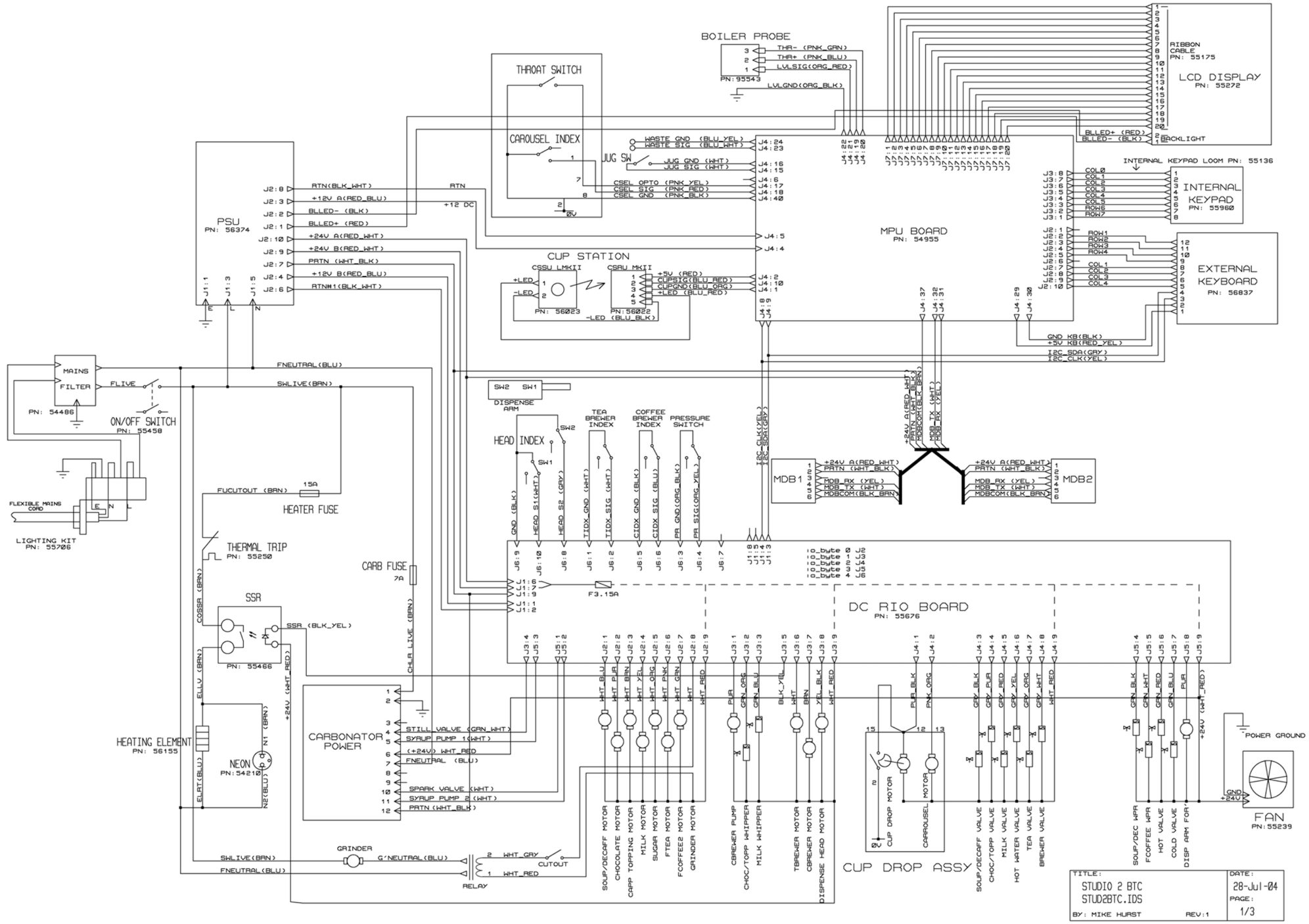
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CSSU MKII
+LED
-LED
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SYRUP PUMP 2 (WHT)
PRTN (WHT_BLK)
DISPENSE ARM
SW2 SW1
HEAD INDEX
TEA BREWER INDEX
COFFEE BREWER INDEX
PRESSURE SWITCH
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HEAD S2 (GRY)
TIDX GND (WHT)
TIDX SIG (WHT)
CIDX GND (BLK)
CIDX SIG (BLU)
PR GND(ORG_BLK)
PR SIG(ORG_YEL)
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FTEA MOTOR
FCOFFEE2 MOTOR
GRINDER MOTOR
CBREWER PUMP
CHOC/TOPP WHIPPER
MILK WHIPPER
TBREWER MOTOR
CBREWER MOTOR
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CUP DROP MOTOR
CARROUSEL MOTOR
CUP DROP ASSY
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MILK VALVE
HOT WATER VALVE
TEA VALVE
BREWER VALVE
SOUP/DEC WPR
FCOFFEE WPR
HOT VALVE
COLD VALVE
DISP ARM FOR
GRINDER
G'NEUTRAL(BLU)
CUTOUT
RELAY
POWER GROUND
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Section 2

Internal Keypad Functions

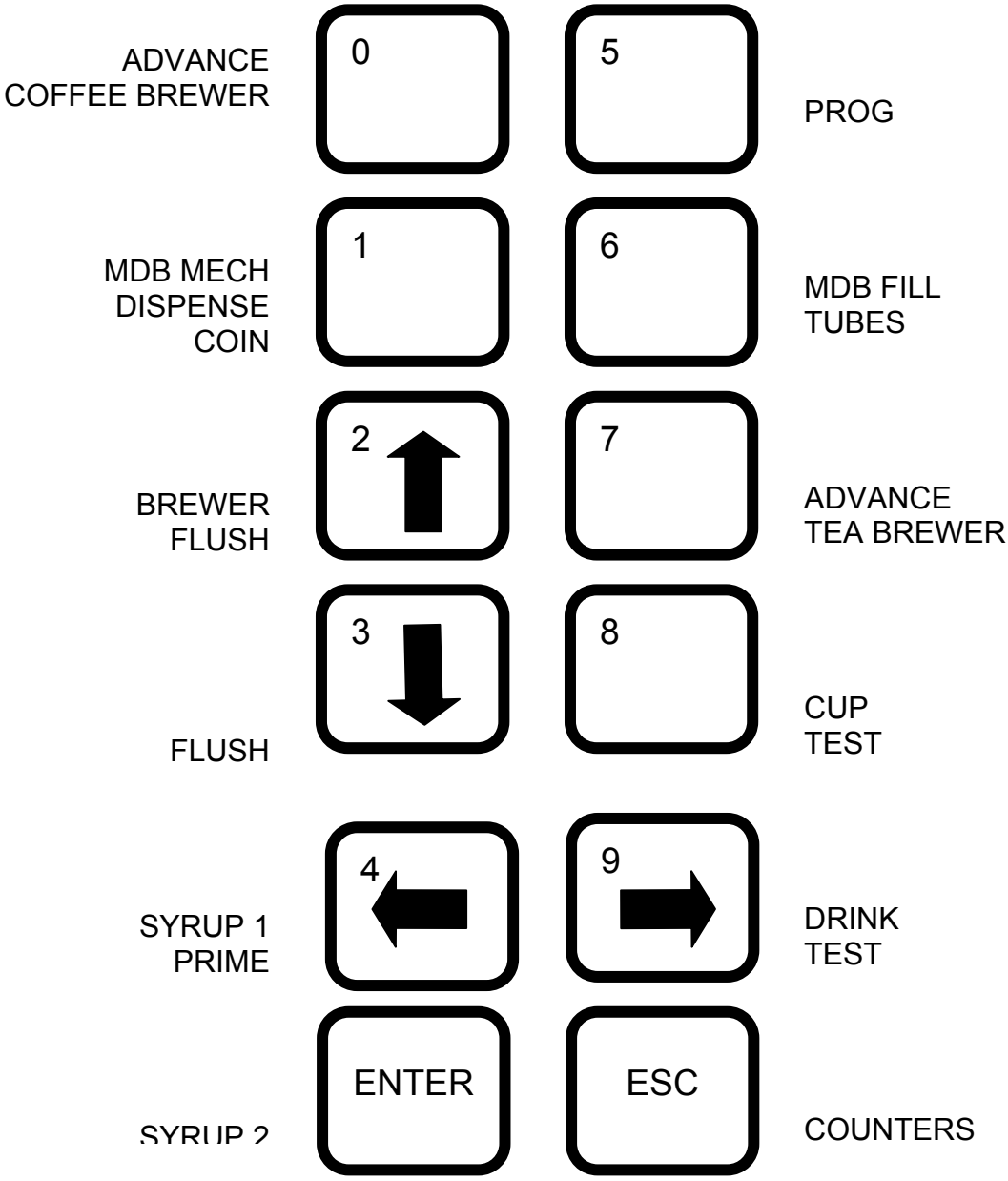


Fig 2.1

STUDIO LINE INTERNAL KEYPAD

1. The internal keypad provides the facility to carry out a number of frequently required machine functions without the necessity to enter any of the user programs.

2. In most cases a single press of the key initiates the function associated with each button. If a further key press is necessary to end the action it will be the escape key.

3. The functions available from the internal keypad are as follows:

a) Advance Coffee Brewer.

If a coffee brewer is fitted, a single depression of this key will cause the brewer unit to index to its next position in the cycle. The purpose of this function is to allow the brewer to be locked prior to a flush cycle so that cleaning agents can be added.

b) MDB Mech Dispense Coin.

This key provides a method to empty the change tubes of an MDB coin mechanism, which does not itself possess the necessary buttons to do so. On pressing the key the external display will change to: -

c)

EMPTY TUBE ←,→
C A B D ENT, ESC

A flashing cursor will appear on the 'C'. The function of the EXTERNAL keys will change as described in section **3** to allow actions to be performed on either the internal or external keypad. Pressing ENTER will cause a coin to be dispensed from tube 'C'. Pressing the → will cause the cursor to move right. With the cursor in this position pressing the ENTER key will cause a coin to be dispensed from the 'A' tube. Repeated use of the ←,→ & ENTER key enables all tubes to be emptied. Pressing the ESCAPE key ends the process.

d) Brewer Flush

This key provides the means to initiate a flush cycle of the fresh brew units. A single press of this key will initiate a cleaning cycle for all brewers fitted to the machine simultaneously. In the case of the instant version this function is redundant.

e) Syrup 1 Prime

Manually controls the pump associated with flavoured syrup number 1. The first press turns on the pump a second press turns it off again. Pressing the ESC key will also turn off the pump.

f) Syrup 2 Prime

Manually controls the pump associated with flavoured syrup number 2. The first press turns on the pump a second press turns it off again. Pressing the ESC key will also turn off the pump.

g) Prog

This key activates the code entry sequence required to access the protected levels of the machine control programs. See section 2b.

h) MDB Fill Tubes

If an MDB coin mechanism is fitted this function allows the change tubes to be filled. On pressing the key the external display will change to:

INSERT FLOAT £0.00

As coins are inserted the value displayed will reflect the total value of the money inserted. Pressing ESCAPE will cause the machine to return to normal operation and zero the credit.

i) Advance Tea Brewer.

If a Tea brewer is fitted, a single depression of this key will cause the brewer unit to index to its next position in the cycle. The purpose of this function is to allow the brewer to be locked prior to a flush cycle so that cleaning agents can be added.

j) Cup Test

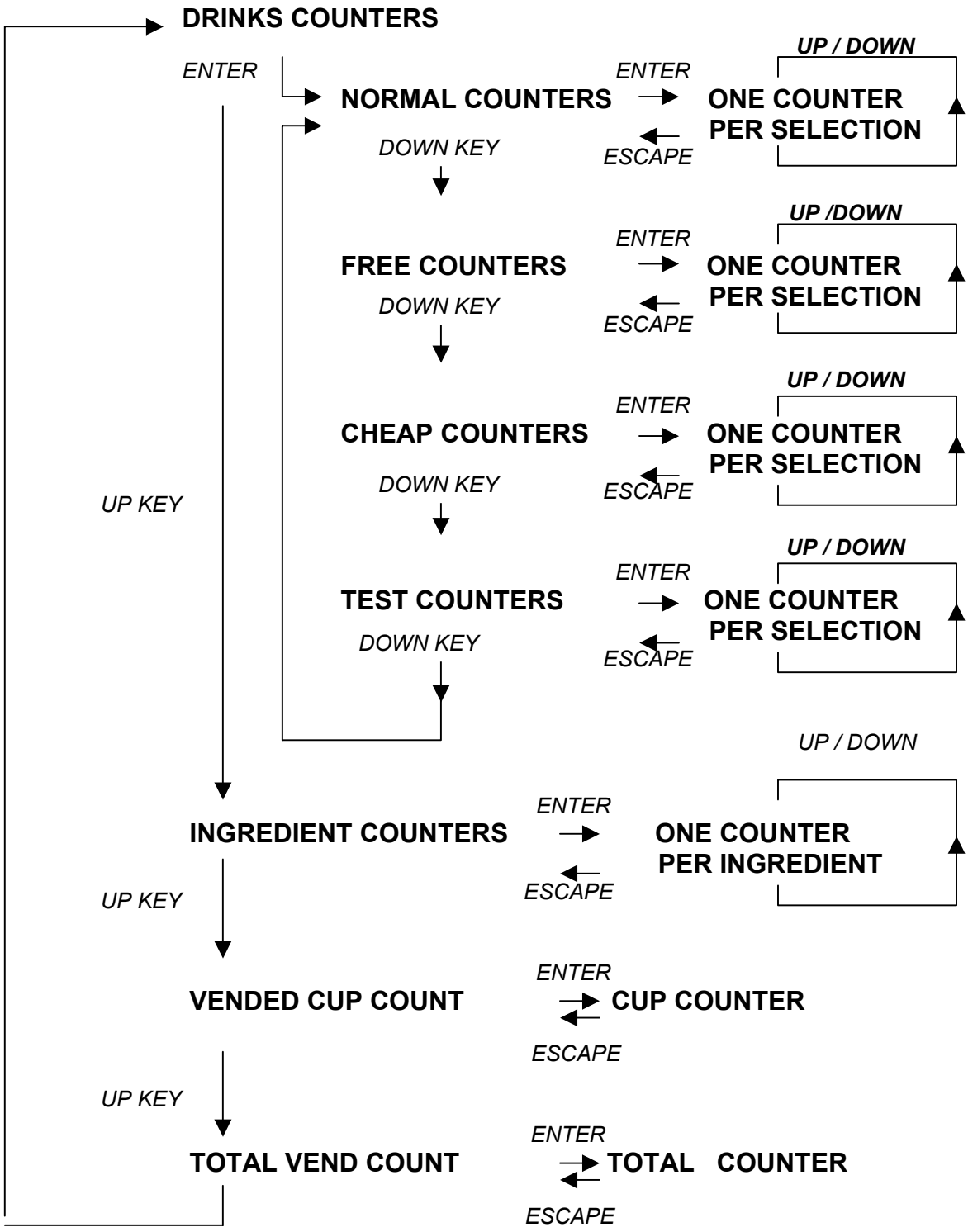
Causes a cup to be dispensed by the cup drop mechanism. The cup carousel will not index unless a selection is made or a cup test performed. This reduces the possibility of damage prevents damage to the carousel occurring because the cup stack has been pushed up from below causing a false out of cups signal to the control board.

k) Drink Test

Allows the next selection to be taken as a free vend.

l) Counters

Pressing the counters key places the machine in manual audit mode. Audit data is accessed via a series of menus. The chart below shows the menu headings in bold text whilst the key presses required to navigate the menu are shown in *italics*. Whilst in this mode the functions of the EXTERNAL keypad change to allow the menus to be accessed from the same side of the door as the display – see section 3 paragraph 5 for button functions in this mode.



Section 3

Programming

The Studio Line Vending machine has a comprehensive configuration program to allow the behaviour and function of the machine to be changed to meet a customer's requirement. There are three levels of access to the configuration functions of the machine. Access each level is protected by means of a four-digit code. The facilities available at each level are shown below:

1. Operator level access

    - Access to price related features only.
    - Factory default Code 1111

2. Manager level access

    - Access to Price related features
    - Inhibit selections
    - Limited range modification of recipes
    - Change Operator level access code.
    - Factory default Code 3333

3. Engineer level access

    - Full access all features
    - Factory default code 4444

ACCESSING THE USER PROGRAMS

4. The programs are accessed by pressing key 5 **(PROG)** on the INTERNAL keypad. The EXTERNAL display will then prompt for input of a four-digit entry code. The code is input using the numbers printed on the keys of the INTERNAL keypad.

- After pressing the PROG key the display will change to: -

PLEASE ENTER ACCESS CODE

- Use the numbered keys on the internal keypad to enter the correct code. It is not necessary to press ENTER. The code will be checked on entry of the fourth digit. Three attempts are allowed before the PROG key must be pressed again. On entry of a valid code the display will change to the menu heading appropriate to the level of access. Whilst in programming mode the functions of the external key pad change to facilitate navigation of the program using the EXTERNAL keypad.

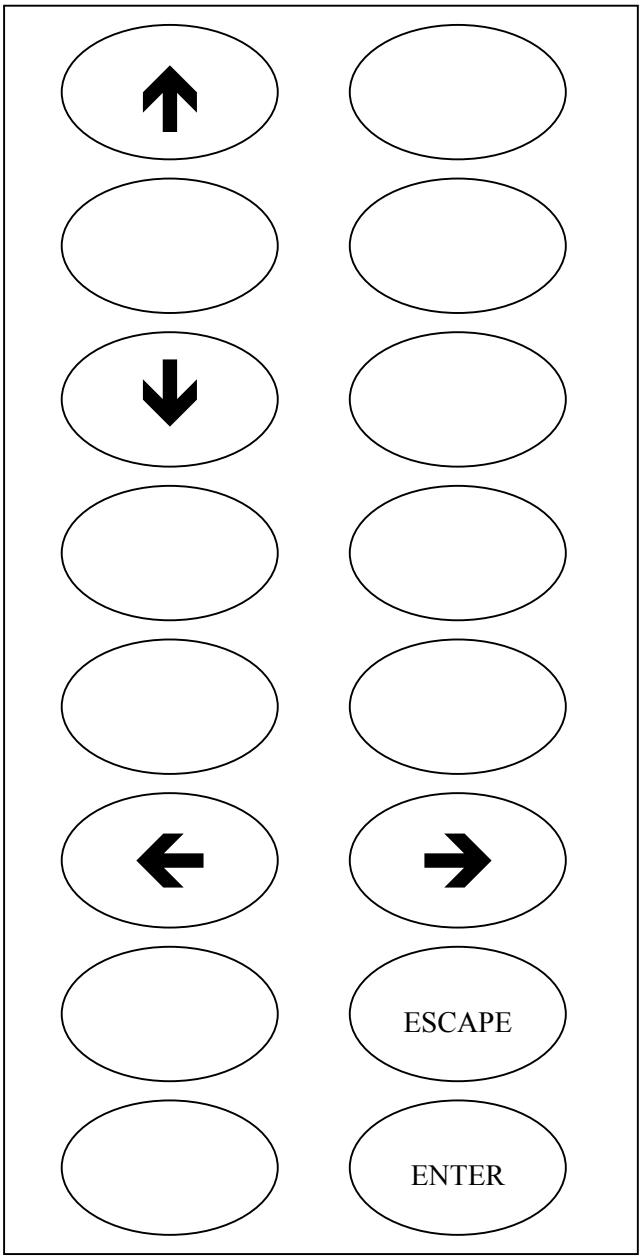
- In the event that the code has been lost or when fitting an un-programmed replacement board it is necessary to complete the circuit between the two pins of the two pin header labelled ENG LINK on the Control board. This forces recognition of any four-digit code. Note, it is safest to avoid entering the default managers or operators code in these circumstances because entry of a valid code will be recognised in preference to the combination of a wrong code plus the ENG LINK and restricted access granted.

1. Note Regarding The ENG LINK

   The Studio Line electronics control system has two major elements these are the Control board and the DC RIO board. The two boards communicate via a three wire Inter Integrated Circuit bus (I^2C bus). Some faults affecting the I^2C bus or Control board configuration can result in persistent system resets, which take place before a code can be entered. To allow recovery / diagnosis from such situations the control system provides an Access Window to a special ‘safe mode’ shortly after power is switched on. If the engineers mode is entered during this window the machine will enter the program with the I^2C bus disabled. Without communication between the DC RIO board and the Control board the OUTPUT TEST facility is ineffective and the state of some inputs will be misreported in the INPUT TEST routines. As a reminder to this effect the sound associated with a key press is truncated to a very short pip rather than a beep. **If the ENG LINK is left in place during power up the machine will enter the engineers program with full access during the Access Window.**

EXTERNAL KEYPAD FUNCTIONS IN PROGRAMMING MODE

5. Having entered a valid code, the keys on the EXTERNAL keypad are used to navigate and use the functions of the user programs. In programming mode the keys assume the following alternative functions:



FUNCTION	KEY
Move up a list of menu options or increment a number.	↑
Move down a list of menu options or decrement a number.	↓
Move the cursor left.	←
Move the cursor right.	→
Move to previous menu option or reject values entered.	**ESCAPE**
Enter the menu option displayed or accept the changes made.	**ENTER**

PROGRAM FUNCTIONS

6. The following table shows the functions available and the access level required to use them within the Studio Line configuration program:

FUNCTION	ACCESS LEVEL REQUIRED		
	OPERATOR	MANAGER	ENGINEER
INGREDIENT TIMES		• limited	•
SET DATE /TIME		•	•
SET PRICING MODE	•	•	•
CHANGE PRICES	•	•	•
INHIBIT DRINK		•	•
ALTER DRINK NAME		•	•
TIMED ACTIVITIES			•
TEMP SETTINGS			•
OUTPUT TEST			•
INPUT TEST			•
SET PRODUCT CONSTS			•
MACHINE STATUS			•
SET DRY VEND MODE			•
SERIAL NUMBER			•
CONFIGURE MACHINE			•
MDB CONFIG			•
EVA-DTS CONFIG			•
PRODUCT CODES			•
OPERATORS CODE		•	•
MANAGERS CODE			•
ENGINEERS CODE			•
CARD ACTIONS			•
EDIT DRINK MAP			•

PROGRAMMING SEQUENCE OF OPERATIONS

7. The method of navigating the menu structure is consistent throughout the program. The ↑ and ↓ keys are used to index through the headings in a particular level or increment / decrement a value. Pressing ENTER will select a submenu or confirm a change whilst ESCAPE will reject a change or return to the previous menu level. The sequence for accessing a menu option, and then accessing a submenu within that option and finally selecting and changing a parameters value, is shown diagrammatically in Fig 3.1.

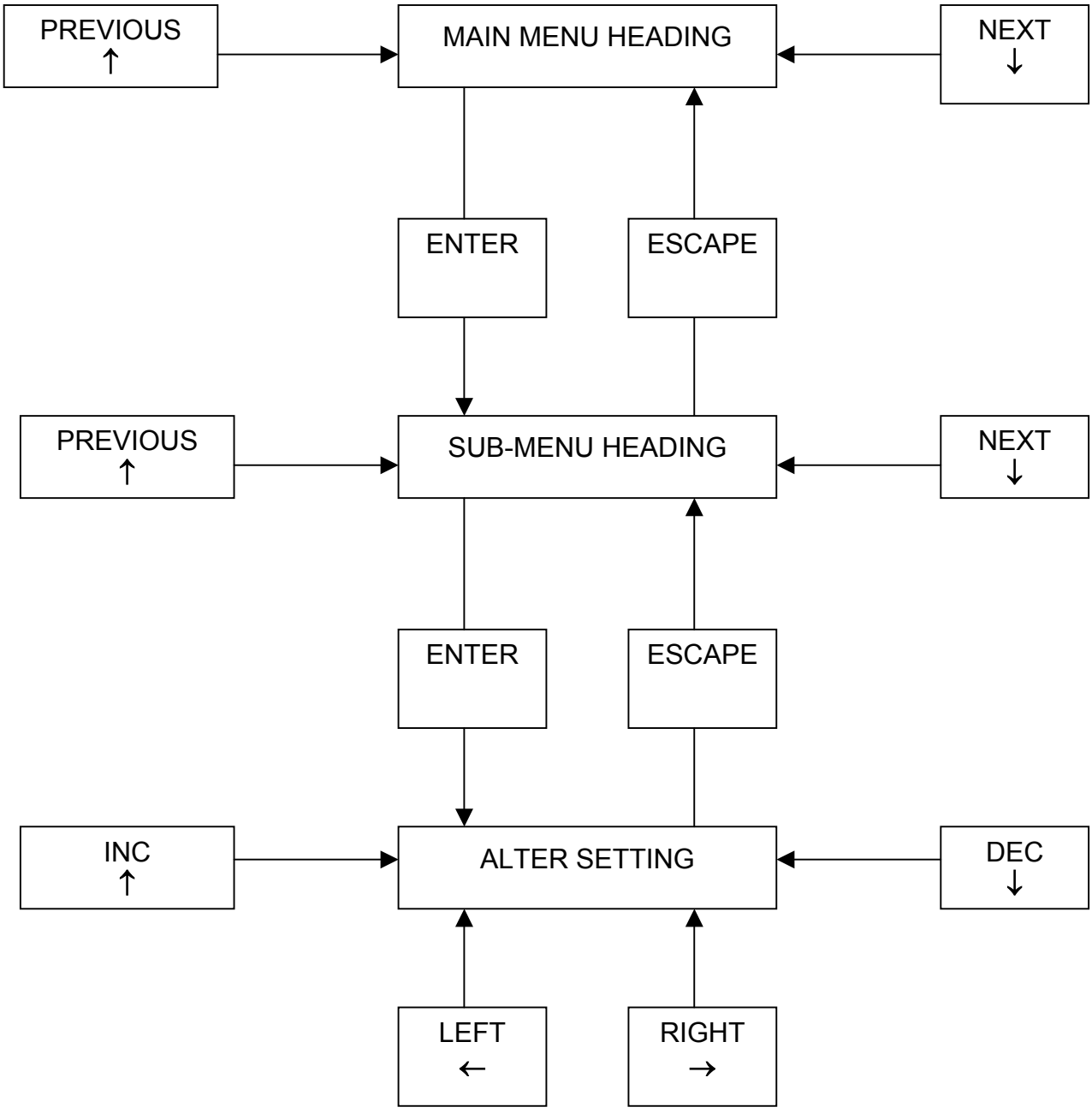


FIG 3.1 ACCESSING AN OPTION SETTING – FLOW DIAGRAM

MENU OPTIONS

Ingredient Times

8. INGREDIENT TIMES provides access to a set of submenus, which allow modification of the parameters controlling the recipe and dispensing of individual drinks. The actual content of the sub menu is dependent on the configuration of the machine. That is for example a Studio Instant Hot version will have different drinks in its INGREDIENT TIMES sub menu to a double freshbrew version fitted with a carbonator. In general the entries of the INGREDIENT TIMES menu will consist only of the drinks available on that particular configuration of machine. The Studio Line range has a number of pre-defined configurations. For each configuration each selection button is associated with a particular drink. This association is fixed for each configuration. For example if the top left button in a given configuration provides an instant Coffee drink then the COFFEE entry in the INGREDIENT sub menu will allow adjustment of a limited number of parameters relating to a coffee selection.

This facility can only be used to edit the settings related to the current drink; it is not possible to reprogram the button to behave as a completely different drink e.g. an espreschoc using this facility. A separate menu option, EDIT DRINK MAP, is available to achieve this purpose.

For each selection a user with Manager level access is granted a limited range adjustment on a subset of the parameters. This allows the site-based personnel to perform minor taste profile modifications without the need to call an engineer. The limited range adjustment is implemented as a multiplying scale factor of between 75% and 125%. In managers mode the limited range of adjustment permitted is displayed as a signed value between –25% and +25% and can be changed in 5% increments. For example the limited range strength control for the coffee ingredient of an Espreschoc selection, which has had its coffee ingredient increased by 5% would appear to a manager level user as:

OP: Coffee Mod +5%

When viewed with engineers level access this would appear as:

OP: Coffee Mod 105

In each case the same parameter is being viewed.

The following tables describe the parameters that can be adjusted for each drink, and indicate the parameters visible at the different each access levels. The drinks available in each configuration are described in Table 14.b later in this Section.

INSTANT COFFEE - * E indicates engineer access level M indicates manager

Parameter Name	Function	Units	Level See *
COFFEE TIME	Ingredient Control	.1 s	E
COFFEE ADJUST	Increment applied to coffee auger run time when strong selected	.1 s	E
WATER TIME	Coffee water dispense valve open duration	.1 s	E
COF MIXER TIME	Coffee whipper motor run duration	.1 s	E
WATER SPLIT	Fraction of total water time, above, to be allocated to the milk sugar valve if milk or sugar is selected Eg 75 will allocate 75% of the water to the milk valve	%	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.1 s	E
MILK ADJUSTMENT	Increment applied to milk auger run time when extra milk selected	.1 s	E
VALVE FACTOR	Compensating variable to account for differing flow rates between milk/sugar and tea valves. If white/sugar drink is bigger than black version decrease, if bigger increase	.1s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E ,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual coffee auger run time will be COFFEE TIME x OP:Coffee Mod /100	%	E,M
OP: Water Mod	Manager level control applied to COF WATER TIME The actual milk auger run time will be COF' WATER TIME x OP:Water Mod/100	%	E,M

Chocomilk	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
CHOCOLATE TIME	Auger run time for Chocolate ingredient	.1 s	E
TOPPING START	Start time for the topping components of the drink referenced to t=0	.1 s	E
TOPPING TIME	Auger run time for Topping ingredient	.1s	E
WATER TIME	Topping/chocolate dispense valve open duration	.1s	E
MIXER TIME	Chocolate mixer motor run time	.1s	E
OP: Topping Mod	Manager level control applied to Topping TIME The actual toppingauger run time will be TOPPING TIME x OP:Topping Mod/100	%	E,M
OP: Chocolate Mod	Manager level control applied to CHOCOLATE TIME The actual coffee auger run time will be TEA TIME x OP:Chocolate Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

DECAF COFFEE -	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
COFFEE TIME	Ingredient Control	.1 s	E
COFFEE ADJUST	Increment applied to coffee auger run time when strong selected	.1 s	E
WATER TIME	Coffee water dispense valve open duration	.1 s	E
MIXER TIME	Coffee whipper motor run duration	.1 s	E
WATER SPLIT	Fraction of total water time, above, to be allocated to the milk sugar valve if milk or sugar is selected	%	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.1 s	E
MILK ADJUSTMENT	Increment applied to milk auger run time when extra milk selected	.1 s	E
VALVE FACTOR	Compensating variable to account for differing flow rates between milk/sugar and tea valves. If white/sugar drink is bigger than black version decrease, if bigger increase	.1s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual coffee auger run time will be COFFEE TIME x OP:Coffee Mod /100	%	E,M
OP: Water Mod	Manager level control applied to COF WATER TIME The actual milk auger run time will be COF' WATER TIME x OP:Water Mod/100	%	E,M

CAPPUCCINO (INSTANT COFFEE) - * E indicates engineer access level M indicates manager			
Parameter Name	Function	Units	Level See *
COFFEE WTR TIME	Coffee water dispense valve open duration	.1 s	E
TOPPING WTR TIME	Coffee water dispense valve open duration	.1 s	E
SUGAR WATER TIME	Coffee water dispense valve open duration	.1 s	E
TOPPING TIME	Auger run time for topping ingredient	.1 s	E
COF MIXER TIME	Coffee whipper motor run duration	.1 s	E
COFFEE TIME	Auger run time for coffee ingredient	.1 s	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
COFFEE START	Offset from t=0 applied to all coffee related components. Ensures drink with white head.	.1 s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Topping Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual coffee auger run time will be COFFEE TIME x OP:Coffee Mod /100	%	E,M
OP: Water Mod	Manager level control applied to COF WATER TIME The actual milk auger run time will be COF' WATER TIME x OP:Water Mod/100	%	E,M

CAFE LATTE -	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
COFFEE TIME	Ingredient Control	.1 s	E
COFFEE ADJUST	Increment applied to coffee auger run time when strong selected	.1 s	E
WATER TIME	Coffee water dispense valve open duration	.1 s	E
COF MIXER TIME	Coffee whipper motor run duration	.1 s	E
WATER SPLIT	Fraction of total water time, above, to be allocated to the milk sugar valve if milk or sugar is selected Eg 75 will allocate 75% of the water to the milk valve	%	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.1 s	E
COFFEE DELAY	Time after t=0 that coffee components of drink start	.1 s	E
VALVE FACTOR	Compensating variable to account for differing flow rates between milk/sugar and tea valves. If white/sugar drink is bigger than black version decrease, if bigger increase	.1s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E ,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual coffee auger run time will be COFFEE TIME x OP:Coffee Mod /100	%	E,M
OP: Water Mod	Manager level control applied to COF WATER TIME The actual milk auger run time will be COF' WATER TIME x OP:Water Mod/100	%	E,M

Espresso (Instant Coffee) -	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
COFFEE TIME	Ingredient Control	.1 s	E
COFFEE ADJUST	Increment applied to coffee auger run time when strong selected	.1 s	E
WATER TIME	Coffee water dispense valve open duration	.1 s	E
WATER SPLIT	Fraction of total water time, above, to be allocated to the milk sugar valve if milk or sugar is selected	%	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.1 s	E
MILK ADJUSTMENT	Increment applied to milk auger run time when extra milk selected	.1 s	E
VALVE FACTOR	Compensating variable to account for differing flow rates between milk/sugar and tea valves. If white/sugar drink is bigger than black version decrease, if bigger increase	.1s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual coffee auger run time will be COFFEE TIME x OP:Coffee Mod /100	%	E,M
OP: Water Mod	Manager level control applied to COF WATER TIME The actual milk auger run time will be COF' WATER TIME x OP:Water Mod/100	%	E,M

Espreschoc (Instant Coffee) - * E indicates engineer access level M indicates manager			
Parameter Name	Function	Units	Level See *
CHOCOLATE START	Chocolate ingredient start time referenced to t=0	.1 s	E
CHOCOLATE TIME	Chocolate ingredient auger run time	.1 s	E
TOPPING START	Topping ingredient start time referenced to t=0	.1 s	E
TOPPING TIME	Topping ingredient auger run time	.1 s	E
WATER TIME	Total amount of valve opening time for this selection allocation of water to the three bowls is automatic	.1s	E
COFFEE START	Start time for coffee component of this selection. Offset from t=0 for Ingredient, water and mixer	.1s	E
COFFEE TIME	Coffee ingredient auger run time	.1 s	E
CHOC MIXER TIME	Chocolate Mixer run time referenced to t=0 other mixer times are calculated automatically	.1s	E
OP: Topping Mod	Manager level control applied to TOPPING TIME The actual topping auger run time will be TOPPING TIME x OP:Topping Mod/100	%	E,M
OP: Choc Mod	Manager level control applied to CHOCOLATE TIME The actual chocolate auger run time will be CHOCOLATE TIME x OP:Choc Mod/100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual chocolate auger run time will be COFFEE TIME x OP:Coffee Mod/100	%	E,M
OP: Water Mod	As engineers mode equivalent however the factor is displayed as a value between –25 and +25 % the increments are 5%	%	E,M

Moccaccino (Instant Coffee) -	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
CHOCOLATE START	Chocolate ingredient start time referenced to t=0	.1 s	E
CHOCOLATE TIME	Chocolate ingredient auger run time	.1 s	E
TOPPING START	Topping ingredient start time referenced to t=0	.1 s	E
TOPPING TIME	Topping ingredient auger run time	.1 s	E
WATER TIME	Total amount of valve opening time for this selection allocation of water to the three bowls is automatic	.1s	E
COFFEE START	Start time for coffee component of this selection. Offset from t=0 for Ingredient , water and mixer	.1s	E
COFFEE TIME	Coffee ingredient auger run time	.1 s	E
CHOC MIXER TIME	Chocolate Mixer run time referenced to t=0 other mixer times are calculated automatically	.1s	E
OP: Topping Mod	Manager level control applied to TOPPING TIME The actual topping auger run time will be TOPPING TIME x OP:Topping Mod/100	%	E,M
OP: Choc Mod	Manager level control applied to CHOCOLATE TIME The actual chocolate auger run time will be CHOCOLATE TIME x OP:Choc Mod/100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual chocolate auger run time will be COFFEE TIME x OP:Coffee Mod/100	%	E,M
OP: Water Mod	As engineers mode equivalent however the factor is displayed as a value between –25 and +25 % the increments are 5%	%	E,M

Chocolate	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
CHOCOLATE TIME	Auger run time for Chocolate ingredient	.1 s	E
WATER TIME	Chocolate water dispense valve open duration	.1s	E
MIXER START	Chocolate mixer motor start time referenced to t-=0	.1s	E
MIXER TIME	Chocolate mixer motor run time	.1s	E
OP: Chocolate Mod	Manager level control applied to CHOCOLATE TIME The actual coffee auger run time will be TEA TIME x OP:Chocolate Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Instant Tea	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
TEA TIME	Auger run time for tea ingredient	.1 s	E
TEA ADJUSTMENT	Increment applied to Tea auger run time when strong selected	.1 s	E
WATER TIME	Tea water dispense valve open duration	.1s	E
WATER SPLIT	Fraction of total water time, above, to be allocated to the milk sugar valve if milk or sugar is selected	%	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.1 s	E
MILK ADJUSTMENT	Increment applied to milk auger run time when extra milk selected	.1 s	E
VALVE FACTOR	Compensating variable to account for differing flow rates between milk/sugar and tea valves. If white/sugar drink is bigger than black version decrease, if bigger increase.	8-14	
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Tea Mod	Manager level control applied to TEA TIME The actual tea auger run time will be TEA TIME x OP:Tea Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Soup	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
SOUP TIME	Auger run time for soup ingredient	.1 s	E
WATER TIME	Soup water dispense valve open duration	.1s	E
MIXER TIME	Soup mixer motor run time	.1s	E
MIXER START	Soup mixer motor start time referenced to t-=0	.1s	E
OP: Soup Mod	Manager level control applied to SOUP TIME The actual coffee auger run time will be TEA TIME x OP:Soup Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Lemon (still drink 1)	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
WATER TIME	Chilled water dispense valve open duration	.1s	E
SYRUP 1 TIME	Syrup pump one operating time	.1s	E
OP: Water Mod	Manager level control applied to WATER TIME The actual valve opening time will be WATER TIME x OP:Water Mod/100	%	E,M
OP:Syrup 1 time	Manager level control applied to SYRUP 1 TIME The actual milk auger run time will be SYRUP 1 TIME x OP:Surup 1 time/100	%	E,M

Orange (still drink 2)	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
WATER TIME	Chilled water dispense valve open duration	.1s	E
SYRUP 2 TIME	Syrup pump two operating time	.1s	E
OP: Water Mod	Manager level control applied to WATER TIME The actual valve opening time will be WATER TIME x OP:Water Mod/100	%	E,M
OP:Syrup 2 time	Manager level control applied to SYRUP 2 TIME The actual milk auger run time will be SYRUP 2 TIME x OP:Surup 2 time/100	%	E,M

Cold Water	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
WATER TIME	Chilled water dispense valve open duration	.1s	E
OP: Water Mod	Manager level control applied to WATER TIME The actual valve opening time will be WATER TIME x OP:Water Mod/100	%	E,M

Fresh brew Tea	* E indicates engineer access level M indicates manager		
Parameter Name	Function	Units	Level See *
TEA WATER TIME	Tea water dispense valve open duration	.1s	E
SUGAR WATER TIME	Milk/Sugar dispense valve opening time if optional ingredient selected. This will be deducted from the TEA WATER TIME if so used.	.1 s	E
TEA TIME	Auger run time for tea ingredient	.1s	E
TEA ADJUSTMENT	Increment applied to tea auger run time when strong selected	.1 s	E
TEA MIXER START	Mixer start time for the optional milk/sugar component That is the milk/sugar mixer start time ref t=0	.1 s	E
TEA MIXER TIME	Mixer run time for the optional milk/sugar component	.1 s	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.01 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.01 s	E
MILK ADJUSTMENT	Increment applied to milk auger run time when extra milk selected	.1 s	E
PAUSE TIME	Delay between first dose of water through brew chamber and the second dose	.1s	E,M
DRAIN TIME	Time to allow tea to drain from the brew chamber before allowing the head to move	.1s	E,M
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Tea Mod	Manager level control applied to TEA TIME The actual tea auger run time will be TEA TIME x OP:Tea Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Fresh Brew Coffee * E indicates engineer access level M indicates manager

Parameter Name	Function	Units	Level See *
INFUSION TIME	Delay after coffee & water are added to brew chamber before brewer closes	.1s	E
WATER TIME	Coffee brewer dispense valve open duration	%	E
M&S WATER TIME	Milk & Sugar valve opening time		E
VALVE FACTOR	Balancing factor to account for difference in flow rate between Milk/Sugar valve and brewer valve. If white / sugar drink is smaller than black version increase VALVE FACTOR and visa versa. Range 8-14	Ratio X 10	E
COFFEE ING TIME	Ingredient Control	.1 s	E
STRENGTH ADJUST.	Increment applied to coffee auger run time when strong selected	.1s	E
SUGAR TIME	Auger run time for Optional ingredient if selected	1. s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.01 s	E
MILK TIME	Auger run time for Optional ingredient if selected	.01 s	E
MILK ADJUSTMENT	Increment applied to milk auger run time when extra milk selected	.1 s	E
PUMP 1 DURATION	Duration of first air pump operation	.1 s	E
PUMP 1 DELAY	Inactive period following first air pump operation	.1 s	E
PUMP 2 DURATION	Duration of second air pump operation	.1 s	E
PUMP 2 DELAY	Inactive period following second air pump operation	.1 s	E
MIXER TIME	Run time for coffee mixer motor referenced to the beginning of the first air pump activity	.1 s	E
BLACK DRAIN TIME	Idle time before head retracts following dispense of selection with no optional components	.1 s	E
BLACK DRAIN TIME	Idle time before head retracts following dispense of selection where milk or sugar have been selected	.1 s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual tea auger run time will be COFFEE TIME x OP:Tea Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Cappuccino (Fresh Brew Coffee) * E indicates engineer access level M indicates manager			
Parameter Name	Function	Units	Level See *
TOPPING START	Start time topping & sugar components. Referenced to t=0.	.1s	E
INFUSION TIME	Delay after coffee & water are added to brew chamber before brewer closes	.1 s	E
WATER TIME	Coffee brewer dispense valve open duration	.1 s	E
TOPPING WATER TIME	Auger run time for topping ingredient	.1s	E
COFFEE ING TIME	Ingredient Control	1. s	E
MIXER TIME	Run time for coffee mixer motor referenced to the beginning of the first air pump activity	.1 s	E
SUGAR WATER TIME	Sugar valve open time if sugar selected if not water is added to topping water	.1 s	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.01 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
TOPPING TIME	Auger run time for Optional ingredient if selected	.1 s	E
PUMP 1 DURATION	Duration of first air pump operation	.1 s	E
PUMP 1 DELAY	Inactive period following first air pump operation	.1 s	E
PUMP 2 DURATION	Duration of second air pump operation	.1 s	E
PUMP 2 DELAY	Inactive period following second air pump operation	.1 s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual tea auger run time will be COFFEE TIME x OP:Tea Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Café Latte (Fresh Brew Coffee) * E indicates engineer access level M indicates manager			
Parameter Name	Function	Units	Level See *
COFFEE ING TIME	Ingredient Control	.1s	E
INFUSION TIME	Delay after coffee & water are added to brew chamber before brewer closes	.1 s	E
WATER TIME	Coffee brewer dispense valve open duration	.1 s	E
PUMP 1 DURATION	Duration of first air pump operation	.1 s	E
PUMP 1 DELAY	Inactive period following first air pump operation	.1 s	E
PUMP 2 DURATION	Duration of second air pump operation	.1 s	E
PUMP 2 DELAY	Inactive period following second air pump operation	.1 s	E
MIXER TIME	Run time for coffee mixer motor referenced to the beginning of the first air pump activity	.1 s	E
MILK START	Start time milk & sugar components. Referenced to t=0.	.1s	E
MILK TIME	Auger run time for Optional ingredient if selected	.1 s	E
MILK WATER TIME	Milk/Sugar dispense valve open duration	.1 s	E
SUGAR TIME	Auger run time for Optional ingredient if selected	.1 s	E
SUGAR ADJUSTMENT	Increment applied to sugar auger run time when extra sugar selected	.1 s	E
OP: Sugar Mod	Manager level control applied to SUGAR TIME. The actual sugar auger run time will be SUGAR TIME x OP:Sugar mod /100	%	E,M
OP: Milk Mod	Manager level control applied to MILK TIME The actual milk auger run time will be MILK TIME x OP:Milk mod /100	%	E,M
OP: Coffee Mod	Manager level control applied to COFFEE TIME The actual tea auger run time will be COFFEE TIME x OP:Tea Mod /100	%	E,M
OP: Water Mod	Manager level control applied to WATER TIME The actual milk auger run time will be WATER TIME x OP:Water Mod/100	%	E,M

Edit Drink Map

9. For each machine type ie Instant, SFB Tea , DFB or SFB Coffee there are a small number of default configurations. Typically one for each cold system option for each canister/ingredient arrangement. Choosing a configuration assigns a drink to each of the eleven drink selection buttons.

In reality for each combination of canister contents, cold system, and brewer options it is typically only possible to produce between eleven and twenty five different beverages. Each configuration contains templates for all of the possible beverages, which could be produced by a machine for which it is appropriate.

When a new configuration is chosen eleven of the possible drinks are assigned to the selection buttons. Table 14 shows all the possible drinks for each configuration. The default assignments are identified with a 'D' the remainder are labelled with and 'a' . This facility provides the method by which the default drink assigned to a selection key can be changed for one of the alternative unused drinks to create alternative menus.

On entering this function, a key number is displayed on the top line of the display, the drink currently assigned to the key is displayed on the bottom line.

(a) For example:

BUTTON NUMBER 5
MOCCACINO

The up and down keys can be used to scroll through the drinks assigned to each of the eleven keys.

(b) To change the drink assigned to a given button press ENTER. The display will change to one of the form below:

MOCCACINO
↑↓ ENTER OR ESCAPE

The up and down keys can be used to scroll through the possible alternative drinks. When the desired alternative is displayed pressing ENTER confirms the change. If it is desired to discard the change pressing ESC will leave the assignment unchanged. The display will revert to the form show in (a).

For many of the drinks both fresh brew and instant versions are possible within the same configuration. For example in a DFB machine with an espresso canister, Café Latte may be made with either fresh or instant coffee. Due to the constraints of the display the name used is CAFÉ LATTE in both cases. At any time during the above process pressing the → arrow will cause additional information about the drink to be displayed. For example when the display is as shown in (b). Pressing → will cause it to change as follows:

(c)

(FRESH CO1) #27
↑↓ ENTER OR ESCAPE

The number displayed, #27, is a unique number assigned to the fresh brew based MOCCACINO recipe. The text (FRESH COF1) provides a more intuitive guide that it is made using fresh coffee 1 for the coffee component.

After all drink button re assignments have been made press ESCAPE to exit the facility. The display will change to :

(d)

COMMIT CHANGES
ENTER=YES ESCAPE=NO

If escape is pressed the machine will remain unchanged. Pressing ENTER will confirm the changes. Only at this point will the changes take effect. A re-initialisation is automatically performed when the drink map is changed. The new menu will be created and default timings assigned to ALL selections.

Notes

This facility should only be used to edit the drink selection menu immediately following installation of a new board and or use of the SET MACHINE TYPE menu in the CONFIGURE MC menu. It may be used to review the assignments at any time provided the changes are not committed on exit.

This function does not provide the facility to create an entirely new drink, merely to substitute one, which it has already determined can be made with the ingredients available in the machine. One cannot, for instance, add a fresh brew coffee drink to a machine without out a coffee brewer.

The same drink cannot be assigned to two keys and set up differently for each. The two keys will map to the same instance of the drink, so changing one will change the other.

Audit data is mapped to the keys, not to the drinks themselves. Changing the drink map on a machine which has been in service will lead to existing audit data now being tied to drinks to which it does not relate. An initialise with the ENGINEERS LINK fitted should be performed first if necessary.

EDITABLE TEXT

10. The Studio II provides two user definable lines of text. These lines, designated the Select Message Text and the Error Message Text respectively, are displayed at intervals whenever the machine is displaying the select drink or error screens respectively. Each message consists of 1 line of 16 characters.

For example in the select drink state the display could alternate between Screens displays as below:

SELECT DRINK CREDIT £0.00	→ ←	SELECT DRINK *Vending Services*

For example while a waste tray full error is present the display could alternate between Screens displays as below:

OUT OF SERVICE WASTE TRAY FULL	→ ←	OUT OF SERVICE *TEL EXT 12345*

Where the text shown in *italics* is the optional error message text.

The EDIT TEXT menu contains the following sub menus, which can be accessed using the ↑↓ keys:

(a) Edit Select Msg

Allows the programmer to change the line of optional text displayed in the select drink state. On pressing ENTER the display will change to one of the form shown below:

EDIT STRING ↑↓ A

The ↑↓ keys are used to scroll through the available characters. The ← → keys can be used to move the cursor along the line of text. When the correct text has been entered pressing Enter confirms the changes whilst pressing escape discards them.

(b) Edit Error Msg

Allows the programmer to change the line of optional text displayed when the machine is in a fault condition.

(c) Erase Select Msg

Allows the programmer to clear the line of optional select message text.

(d) Erase Error Msg

Allows the programmer to clear the line of optional Error message text

Card Actions

11. Entering **Card actions** provides access to a number of submenus, which relate to the operation of the Studio line ranges optional smart card interface. The smart card interface provides the capability for both audit and engineering configuration activities. In the event that the reader is not fitted or an unreadable card is placed in the reader any attempt to enter this menu will result in the message INSERT CARD being displayed. Pressing ESC will return to the main menu. There are two types of card; one type is programmed to hold machine configuration data and the other audit information. The cards are identical; the choice of functionality is made by means of formatting. This must be carried out on a machine before a card can be used. The submenus of CARD ACTIVITIES depend on the type of card inserted and its contents as follows:

a) FORMAT CARD

Smart cards can be formatted for use as either an audit card or a preset (engineering function) card. A card formatted using the MAKE AUDIT CARD function can only be used to hold audit data and likewise a card formatted using the MAKE PRESET CARD can only be used to hold data files as described in sections a to d above.

Cards formatted as Engineering/configuration cards may hold **one** file of each of the following types:

1. MACHINE
   A file containing all of the data necessary to create an exact copy of a machine set up i.e. to effectively allow a machine to be 'cloned'. This includes drink parameters, general setting, serial number, counters and timed events and prices.
2. CONFIG
   A file containing all of the data necessary to create an copy of a machines operational parameters. This includes only the drink parameters and general setting.
3. PRICE
   A file containing the drink details.
4. EVENTS
   A file containing the details of any timed activities that have been set up.

Cards formatted as AUDIT cards may only hold audit data. Audit data will be written to the card when it is inserted into the reader if the METHOD OF AUDIT in the EVA DTS CONFIG menu has been set to CARD.

b) LOAD, SAVE & DELETE <filetype> where <filetype> is MACHINE,CONFIG,PRICE or EVENTS

If a card contains a data file of a given type a LOAD & DELETE menu for that file type will be available. If it does not then a SAVE menu to allow its creation will be available. The machine should be switched off and on after loading files.

Set Date and Time

12. Entering SET DATE & TIME provides access to a sub-menu consisting of SET DATE and SET TIME.

(a) Set Date

The SET DATE option allows the programmer to change the displayed date.

(b) Set Time

The SET TIME option allows the programmer to change the displayed time.

The battery fitted to the 54955 Control board has an open circuiting link to prevent discharge during extended periods of storage. When commissioning a new board the links labelled CLOCK BAT on the control board must be fitted otherwise the board will not maintain the time when power is removed.

The 54955 Control board contains a lithium battery. Care should be taken to dispose of this in an appropriate manner should a board be scrapped. The board should not be disposed of by burning.

Set Pricing Mode

13. Entering SET VEND PRICING allows the programmer to select one of the following Pricing modes:

    - NORMAL PRICES
    - ALL DRINKS FREE
    - CHEAP PRICES

    The selected mode becomes the default setting to which the machine will return after any timed activities.

Change Prices

14. Entering CHANGE PRICES provides access to the following sub-menu:

    - NORMAL PRICES
    - CHEAP PRICES
    - CHANGE CUP PRICE

    Entering NORMAL PRICES or CHEAP PRICES provides access to a list of drinks with corresponding prices. The price of a displayed drink can be changed by pressing ENTER, altering the value shown, and pressing ENTER again.

    Entering CHANGE CUP PRICE allows the programmer to select the price of a plastic cup (and is preset at 0 pence). The value entered here is deducted from the normal price of a drink when there is no requirement for a dispensed plastic cup, i.e. when customers' own cups or mugs are used.

Inhibit Drinks

15. Entering INHIBIT DRINKS provides access to a sub-menu of drinks, each one suffixed with the availability (AVAILABLE or INHIBITED). The status of a displayed drink can be changed by pressing ENTER, altering the status by using the UP or DOWN keys, and pressing ENTER again.

Alter Drink Name

16. The ALTER DRINK NAME menu allows the name displayed when a particular drink is selected to be changed to one of a number of pre-defined alternatives.

To avoid confusion the drink retains its original name in this submenu. The alternative name will be used to reference that selection for all other display and audit activities. The reason retaining the original reference to the name in this submenu is that for example it could be that both syrup drinks are to be orange temporarily. Once the lemon name had been changed to orange it would not be possible to tell the altered drink from the existing one when it came time to change it back again.

The list of alternative drink names is as follows:

CHOC-O-CINO	BLACKCURRANT	LEMON
COLA	ORANGE	VEG.SOUP
TOMATO SOUP	BEEF SOUP	CAPPUCCINO
LEMON	PEACH	SOUP
LIME	MUSHR'M SOUP	MILO
CAFE MOCHA	ESPRESCHOC	CAFE CREME
ESPRESSO X 2	CHICKEN SOUP	PEPSI COLA
TROPICAL FRUIT	COCA COLA	DIET COCA COLA
PEPSI-MAX	PEPSI	DIET PEPSI
ORANGE TANGO	LEMON	STILL JUSODA
DIET TANGO LEMON	SPARKLING JUSODA	
IRN-BRU	STILL IRN-BRU	FIZZY IRN-BRU
COFFEE	WHIPPED COFFEE	ELDERFLOWER
VIMTO	COLA	LEMON TEA

Note Changing a drinks name **does not affect** the actual parameters that control the drink. It only affects the name displayed when that selection is chosen or audited. If the name of the chocolate selection is changed to LIME, the chocolate ingredient motor, valves and mixer will still run when that selection is taken. To change the drink rather than the drink name, use the EDIT DRINK MAP facility.

TIMED ACTIVITIES

17. The TIMED ACTIVITIES option allows the machine to be set to different states on a timed basis. The states currently available are as follows:

(a) Reduced – causes the machine to offer drinks at the reduced rate.

(b) Free – causes the machine to offer drinks free.

(c) Self Clean – causes the machine to flush itself.

(d) Shutdown – causes the machine to stop vending.

(e) Unused - timed activity slot not used, operate as normal.

(f) Economy – causes the machine to temporarily shutdown until a drink is requested. The water in the boiler is maintained at a reduced temperature and a message prompting potential users to press start and so cause the machine to heat and return to operation is displayed. After a period of inactivity the machine returns to low power mode.

Entering TIMED ACTIVITIES provides access to a sub-menu consisting of ten timed activities. Two types of timing routine, Daily and Block, are available for each activity.

A. Daily

DAILY 0930 1730
M0N>FRI REDUCED

The above display describes a timed activity where, between 9:30am and 5:30pm, Monday to Friday, the machine operates in the reduced prices mode.

B. Block

BL0CK 0930 M0N>
1730 FRI REDUCED

The above display describes a timed activity where, between 9:30am on Monday and 5:30pm on Friday, the machine operates continually in the reduced prices mode.

When entering a SELF CLEAN state into a daily routine, a comma will appear between the start and end times, indicating that flushing will occur at the two specified times and not between them. Where only one SELF CLEAN per day is required, the time entered in the second slot should be 1 minute later than the first. If both times entered are the same flushing may not take place.

NOTE The SELF CLEAN state must not be entered in a block routine.

The displayed activity can be changed by altering the data using the LEFT, RIGHT, UP and DOWN keys. With the correct data entered, the ENTER key is pressed to move to the next activity, or ESCAPE pressed to leave.

TEMPERATURE SETTINGS

18. Entering TEMP SETTINGS provides access to the following sub-menu:

- DESIRED TEMP
- MINIMUM TEMPERATURE

(a) Desired Temperature – allows the desired water heater temperature to be set.

(b) Minimum Temperature – allows the minimum temperature at which vending may commence to be set.

The above values are set in degrees centigrade. The minimum possible temperature the control system can measure is 57ºC it is not possible to set temperatures below this value. As addition information the actual value read by the analogue to digital converter on the control board corresponding to the temperature set is displayed in parenthesis next to the ºC value.

OUTPUT TEST (INST VERSION)

19. The OUTPUT TEST allows any of the output devices to be turned on and off to aid with diagnostics. On entering output test the display will show the device name, a prompt indicating that the ↑↓ & ENTER keys are active and a number indicating the position of the device in the list. The arrow keys are used to scroll through the list of devices whilst the ENTER key will activate and de activate the device.

Note 1

It should be noted that some specific devices specifically the SSR, Carousel Motor and Inlet Valve may not respond as anticipated to OUTPUT TEST. The software controlling these devices is constantly running and will quickly override the control action of the output test.

Note 2

The output test function will not work if the engineers program was entered during the ACCESS WINDOW immediately after power up or if the machine was powered up with the ENG LINK in place. See section 3 paragraph 4.

INPUT TEST

20. The INPUT TEST function allows the state of the control board input signals to be examined. The input test menu is common to all three versions of the Studio Line range and as such contains references to all possible input devices. The state of brewer position index inputs will be visible even if the brewers themselves are not fitted on a particular version.

On entering input test, the display will show the device name of the first device in the list and logical state associated with the condition of its input. That is to say the meaning of the state of the input is displayed rather than a simple high or low value. Thus the values displayed for the waste probe are WET or DRY. The screen will dynamically reflect the condition of the input. The ↑↓ keys are used to step through each input in turn. The following input signals can be examined:

INPUT DEVICE	STATE 1	STATE 2
Coffee brewer index	CBREWER HOME	CBREWER NOT HOME
Carousel throat switch	CUPS AVAILABLE	CUPS NOT AVAILABLE
Carousel position switch	CUP DROP IN POS	CUP DROP OUT POS
Dispense arm 'vend position' micro switch	IN V POS ie forward and ready to vend	NOT IN V POS
Dispense arm 'HOME position' micro switch	ARM NOT HOME	DISP ARM HOME
Boiler level probe	BOILER IS WET	BOILER IS DRY
Waste tub probe	WASTE IS WET	WASTE IS DRY
Spare level Input	SPARE IS WET	SPARE IS DRY
User cup sensor	CUPSNS:NO CUP	CUPSNS:NO CUP
Tea brewer index switch	TBREWER NOT HOME	TBREWER HOME
Brewer pressure switch	NO PRESSURE	PRESSURE
Jug switch	0 (Normal)	1 (1=jug or free)

SET PRODUCT CONSTANTS

21. The Studio line control system maintains a counter for the amount of each ingredient consumed. For these counters to work correctly the throw rate in grams per second actually dispensed from each ingredients canister must be input. One way to determine the correct value is to catch the ingredient dispensed during ten vends of a particular type and then divide the weight of ingredients so dispensed by the auger run time figures set for that vend. For this to work all scale factors must be set to 100.

    If the ingredient counters are not required this facility can safely be ignored. The values entered are for audit purposes only and do not affect the drink formulations or machine operation in any way.

MACHINE STATUS

22. Entering MACHINE STATUS provides access to the status of the following machine features:

- TEMP STATUS
- 1^2C HEALTH
- MEMORY USAGE*
- SOFTWARE VERSION

(a) TEMP STATUS

This display provides information relating to the heater control circuit. A power (PWR) level value and a graphical representation of the drive waveform to the heater are displayed. The temperature reading in degrees centigrade derived from the thermistor probe in the water boiler is displayed along with the analogue-to-digital converter value from which the temperature was calculated is parenthesis.

(b) I^2C Health

This display provides information relating to the 1^2C serial link between the Controller and RIO Boards. A percentage 'health' reading is given, indicating the success rate of communication of the link. A reading of less than 100% may indicate the presence of electrical noise. The number of negative acknowledgements (NACKS) is also recorded.

(c) Software Version

These displays indicate the version of the software installed on the Controller Board. (Program + EPROM = Firmware.) The firmware version should be quoted when seeking advice.

SET DRY VENDS

23. Entering SET DRY VENDS provides access to the following sub-menu:

- VENDS ARE NORMAL
- VENDS ARE DRY

(a) Vends are Normal. All vends are dispensed with water as normal.

(b) Vends are dry. All vends are dispensed without water. This allows ingredients to be weighed. If a multi-ingredient drink is selected, only those ingredients will be vended.

SERIAL NUMBER

24. Entering SERIAL NUMBER accesses the following sub-menu:

- M/C SERIAL NUMBER
- M/C AUDIT NUMBER

(a) M/C Serial Number

The machine serial number consists of 8 digits and identifies the machine on audit trails.

(b) M/C Audit Number

The machine audit number indicates the number of audits carried out to date.

CONFIGURE MACHINE

25. Entering CONFIGURE M/C provides access to the following machine configuration sub menu headings:

a. GENERAL SETTINGS

The GENERAL SETTINGS menu provides access to a number of diverse parameters controlling machine operation that do not naturally group with any of the other control variables.

Parameter	**Possible values** (Default in bold)	
SILENT KEYS	**0** Keys give audible feedback	1 Keys are silent
TOKEN ONLY	**0** Messages appropriate to coins/card system or free	1 Messages appropriate to token only operation
CHIPPER /CHIPKNIP	**1** Suppress credit display if just card system fitted	0 Normal display of credit
FLUSH ALARM	**0** Sound load siren while flushing	1 Sound siren quietly while flushing
WATER SHOT START	**20** (Consult factory before changing) Time after a fresh coffee dispense cycle ends that a grout clearing water shot starts.	
WATER SHOT DUR	**20** (Consult factory before changing) Duration in 1/100 seconds that the water shot described above lasts.	
BELT WARN TIME	**700** Time, in 1/100 seconds, after the pressure sensor should have reported the coffee brew chamber depressurised but has not, that a 'New filter belt' warning is displayed	
BELT FAULT TIME	**2000** Time, in 1/100 seconds, after the pressure sensor should have reported the coffee brew chamber depressurised but has not, that a 'New filter belt' fault occurs	
ROTATION LIMIT	**100** Time, in 1/100 seconds, after the pressure sensor should have reported the coffee brew chamber depressurised but has not, that a decision is made to perform an extra brewer rotation on the next brewer vend.	
NO BELT WARNING	**1** Inhibits the belt warning, meaning that only when the belt fault state is reached does anything get displayed.	0 Enables the belt warning, meaning that warnings are shown before the belt state becomes critical.
ENG MODE TIMEOUT	**0** Do not automatically exit engineers mode	1 (recommended**)** If no key is pressed exit from the engineers program will commence after 30 seconds
FAST CUP DROP	**1** Fast motor standard	0 Slow motor version
CUP SENSOR TYPE	**1** Microswitch	0 Negative logic infra red

MAX EXTRA CUPS	**2** Number of retries at dispensing a cup before a long delay until next cup occurs to deter theft	
CURRENCY SYMBOL	**1** Indicates that all displayed monetary values should be prefixed with a pounds sterling (£) symbol. Other values are :- 0 : No symbol displayed 2 : Euro symbol displayed 3 : Dollar symbol displayed	
SIMCARD LOCATION	**0** Simcard reader is attached to Port J6 of the controller board	1 Simcard reader is attached to Port J4 of the controller board
GLOBAL SCALING	**170** Size of drink in cc. Assuming machine default parameters and valves were set up to give 170cc then this variable can be used to scale all drinks together to rapidly accommodate changing cup sizes	

b. The SET MACHINE TYPE menu provides the means by which the control board software is configured to produce the desired menu and work with the appropriate combination of brewers and chillers present in the machine. This operation **must be carried out** when fitting a new or replacement board.

On selecting this option the display will change to one of the following form

STUDIO TYPE #nnn ABCDEFGHI JKLMNOP

Where ABCDEFGHI is an abbreviated description of the machine configuration and #nnn is the number of the configuration for reference purposes. The ↑↓ keys are used to scroll through the list of possible configurations. Pressing ENTER selects the new configuration.

For Instant and Fresh Brew Tea versions initialisation will proceed automatically from this point. Whilst the set up process takes place the LCD indicates the status of the procedure. On completion the screen reverts to the SET MACHINE TYPE menu. In order to aid understanding the following table contains an explanation of the abbreviations used.

Abbreviation	**Explanation**
C+D	Machine has Coffee & Decaf canisters
C+E	Machine has Coffee & Espresso canisters
C&S	Machine has Coffee & Soup canisters
HOT	Machine has no cold water capability
HC	Machine has a chiller unit for cold water
HC2	Machine has a chiller unit with two flavoured syrups
HCC2	Machine has a carbonator unit with two flavoured syrups
INST	All drinks made from instant products
SFBT	Tea selections are fresh brew
SFBC	Coffee selections are fresh brew
DFB	Tea and regular coffee are fresh brew
Numeric suffix	Sub configuration identifier

If a configuration with a Fresh Brew Coffee capability is selected you will be offered the opportunity to select between R & G (Default) and BTC (Optional) configuration. The display will appear as below:

SET BREWER TYPE
ENTER=YES ESC=NO

If Escape/No is selected initialisation will be performed using a set of defaults appropriate to R & G ingredients. After pressing ENTER to opt to specify the brewer type, the type can be changed using the ↑↓ arrow keys:

NO BEAN GRINDER
↑↓, ENTER or ESC

BEAN GRINDER
↑↓, ENTER or ESC

Select NO BEAN GRINDER for the R & G case and BEAN GRINDER for the BTC case. Pressing ENTER confirms the selection. Whilst the set up process takes place the LCD indicates the status of the procedure. On completion the screen reverts to the SET MACHINE TYPE menu. In order to aid understanding the previous table contains an explanation of the abbreviations used.

Care should be exercised when using this option, as all previous settings will be lost.

At the time of writing there are 40 configurations. The abbreviated machine description and menu associated with each configuration is shown in the following table.

D = In mapping by default a = Available alternate. Mapping Identification	Freshbrew Coffee 1	Freshbrew Coffee 2	Fresh Espresso 1	Fresh Tea	Instant Coffee	Instant Espresso	Instant Cappuccino	Instant Espreschoc	Soup	Chocolate	Chocomilk	Still Water	Instant Decaf	Fresh Espresso 2	Hot Water 2	Cup Only	Fresh Cappuccino	Instant Mocha	Fresh Espreschoc	Instant Tea	Still Syrup 1	Sparkling Syrup 1	Still Syrup 2	Sparkling Syrup 2	Instant Latte	Fresh Mocha	Fresh Latte	Sparkling Water
1 : INST HOT C+D					**D**	**D**	**D**	**D**		**D**	**D**		**D**		a	a		**D**		**D**					**D**			
2 : INST HC C+D					**D**	**D**	**D**	**D**		**D**	**D**	**D**	**D**		a	a		**D**		**D**					**D**			
3 : INST HC2 C+D					**D**	a	**D**	**D**		**D**	**D**	**D**	**D**		a	a		a		**D**	**D**		**D**		**D**			
4 : INST HCC2 C+D					**D**	a	**D**	a		**D**	**D**	**D**	**D**		a	a		a		**D**	a	**D**	**D**	**D**	**D**			a
5 : INST HOT C&S					**D**	**D**	**D**	**D**	**D**	**D**	**D**				a	a		**D**		**D**					**D**			
6 : INST HC C&S					**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**			a	a		**D**		**D**					**D**			
7 : INST HC2 C&S					**D**	a	**D**	**D**	**D**	**D**	**D**	**D**			a	a		a		**D**	**D**		**D**		**D**			
8 : INST HCC2 C&S					**D**	a	**D**	a	**D**	**D**	**D**	**D**			a	a		a		**D**	a	**D**	**D**	**D**	**D**			a
9 : SFBT HOT C+D				**D**	**D**	**D**	**D**	**D**		**D**	**D**		**D**		a	a		**D**							**D**			
10 : SFBT HC C+D				**D**	**D**	**D**	**D**	**D**		**D**	**D**	**D**	**D**		a	a		**D**							**D**			
11 : SFBT HC2 C+D				**D**	**D**	a	**D**	**D**		**D**	**D**	**D**	**D**		a	a		a			**D**		**D**		**D**			
12 : SFBT HCC2 C+D				**D**	**D**	a	**D**	a		**D**	**D**	**D**	**D**		a	a		a			a	**D**	**D**	**D**	**D**			a
13 : SFBT HOT C&S				**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**				a	a		**D**							**D**			
14 : SFBT HC C&S				**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**	**D**			a	a		**D**							**D**			
15 : SFBT HC2 C&S				**D**	**D**	a	**D**	**D**	**D**	**D**	**D**	**D**			a	a		a			**D**		**D**		**D**			
16 : SFBT HCC2 C&S				**D**	**D**	a	**D**	a	**D**	**D**	**D**	**D**			a	a		a			a	**D**	**D**	**D**	**D**			a
17 : DFB HOT C+D	**D**	a	**D**	**D**						**D**	**D**		**D**	a	a	a	**D**		**D**							**D**	**D**	
18 : DFB HC C+D	**D**	a	**D**	**D**						**D**	**D**	**D**	**D**	a	a	a	**D**		**D**							**D**	**D**	
19 : DFB HC2 C+D	**D**	a	a	**D**						**D**	**D**	**D**	**D**	a	a	a	**D**		**D**		**D**		**D**			a	**D**	
20 : DFB HCC2 C+D	**D**	a	a	**D**						**D**	**D**	**D**	**D**	a	a	a	**D**		a		a	**D**	**D**	**D**		a	**D**	a
21 : DFB HOT C+E	**D**	a	a	**D**	**D**	**D**	**D**	**D**		**D**	**D**			a	a	a	a	**D**	a						**D**	a	a	
22 : DFB HC C+E	**D**	a	a	**D**	**D**	**D**	**D**	**D**		**D**	**D**	**D**		a	a	a	a	**D**	a						**D**	a	a	

Table 14.a Machine Configuration Matrix

D = In mapping by default a = Available alternate. Mapping Identification	Freshbrew Coffee 1	Freshbrew Coffee 2	Fresh Espresso 1	Fresh Tea	Instant Coffee	Instant Espresso	Instant Cappuccino	Instant Espreschoc	Soup	Chocolate	Chocomilk	Still Water	Instant Decaf	Fresh Espresso 2	Hot Water 2	Cup Only	Fresh Cappuccino	Instant Mocha	Fresh Espreschoc	Instant Tea	Still Syrup 1	Sparkling Syrup 1	Still Syrup 2	Sparkling Syrup 2	Instant Latte	Fresh Mocha	Fresh Latte	Sparkling Water
23 : DFB HC2 C+E	**D**	a	a	**D**	**D**	a	**D**	**D**		**D**	**D**	**D**		a	a	a	a	a	a		**D**		**D**		**D**	a	a	
24 : DFB HCC2 C+E	**D**	a	a	**D**	**D**	a	**D**	a		**D**	**D**	**D**		a	a	a	a	a	a		a	**D**	**D**	**D**	**D**	a	a	a
25 : DFB HOT C&S	**D**	a	**D**	**D**					**D**	**D**	**D**			a	a	a	**D**		**D**							**D**	**D**	
26 : DFB HC C&S	**D**	a	**D**	**D**					**D**	**D**	**D**	**D**		a	a	a	**D**		**D**							**D**	**D**	
27 : DFB HC2 C&S	**D**	a	a	**D**					**D**	**D**	**D**	**D**		a	a	a	**D**		**D**		**D**		**D**			a	**D**	
28 : DFB HCC2 C&S	**D**	a	a	**D**					**D**	**D**	**D**	**D**		a	a	a	**D**		a		a	**D**	**D**	**D**		a	**D**	a
29 : SFBC HOT C+D	**D**	a	**D**							**D**	**D**		**D**	a	a	a	**D**		**D**	**D**						**D**	**D**	
30 : SFBC HC C+D	**D**	a	**D**							**D**	**D**	**D**	**D**	a	a	a	**D**		**D**	**D**						**D**	**D**	
31 : SFBC HC2 C+D	**D**	a	a							**D**	**D**	**D**	**D**	a	a	a	**D**		**D**	**D**	**D**		**D**			a	**D**	
32 : SFBC HCC2 C+D	**D**	a	a							**D**	**D**	**D**	**D**	a	a	a	**D**		a	**D**	a	**D**	**D**	**D**		a	**D**	a
33 : SFBC HOT C+E	**D**	a	a		**D**	**D**	**D**	**D**		**D**	**D**			a	a	a	a	**D**	a	**D**					**D**	a	a	
34 : SFBC HC C+E	**D**	a	a		**D**	**D**	**D**	**D**		**D**	**D**	**D**		a	a	a	a	**D**	a	**D**					**D**	a	a	
35 : SFBC HC2 C+E	**D**	a	a		**D**	a	**D**	**D**		**D**	**D**	**D**		a	a	a	a	a	a	**D**	**D**		**D**		**D**	a	a	
36 : SFBC HCC2 C+E	**D**	a	a		**D**	a	**D**	a		**D**	**D**	**D**		a	a	a	a	a	a	**D**	a	**D**	**D**	**D**	**D**	a	a	a
37 : SFBC HOT C&S	**D**	a	**D**						**D**	**D**	**D**			a	a	a	**D**		**D**	**D**						**D**	**D**	
38 : SFBC HC C&S	**D**	a	**D**						**D**	**D**	**D**	**D**		a	a	a	**D**		**D**	**D**						**D**	**D**	
39 : SFBC HC2 C&S	**D**	a	a						**D**	**D**	**D**	**D**		a	a	a	**D**		**D**	**D**	**D**		**D**			a	**D**	
40 : SFBC HCC2 C&S	**D**	a	a						**D**	**D**	**D**	**D**		a	a	a	**D**		a	**D**	a	**D**	**D**	**D**		a	**D**	a

Table 14.b Machine Configuration Matrix
Continued

c. CASH SYSTEM

Existing versions of the Studio Line range of equipment support MDB change giving coin mechanisms, card reader units and bill validators, and Digicard cashless payment systems. This option in this sub-menu allows the type of credit device to be selected. At present NO SYSTEM, MDB PROTOCOL and DIGICARD ONLY are the only options, however other choices to allow the selection of proprietary systems may be added in future versions.

If no payment system is connected NO SYSTEM should be selected.

To enable an MDB peripheral MDB PROTOCOL should be selected. If MDB PROTOCOL is selected and communication with at least one peripheral does not take place the error screen below will de displayed.

OUT OF SERVICE MECH LINK ERROR

In MDB PROTOCOL mode, a Digicard device may also be connected and used, but MDB will be the primary protocol, and the messages displayed will be appropriate to the type of MDB device.

In DIGICARD ONLY mode, no MDB devices will be supported, and all payment system messages will relate to the Digicard.

d. JUG SETTINGS

The Studio Line machine can be switched to a special 'Jug Mode' using a keyed switch located on the RHS inset panel. Whilst in this mode the machine will automatically repeat a number of cycles of a selected single cup portion. The number of repetitions can be altered by repeatedly pressing the selections' key to increase the number of cycles. When the number of cycles reaches a programmable maximum it resets to one.

By default only the black coffee, decaf and tea selections can be selected in jug mode How ever it is possible to override this to enable pot of white / sugared tea and coffee. A further override forces the entire menu to be available. The following table summarises the function of the jug mode parameters:

Parameter	Function
MAX CUPS IN JUG	Maximum number of cycles allowed
JUG KEY=FREE KEY	Re assign jug key to work as a free key. Default = NO
OPTIONS ON JUGS	Allow milk /sugar to be selected Default = NO
ALL DRINKS JUGABLE	Allow all menu items to be jugged Default = NO
PRICED JUGS	Enables paid vending for jugs. If enabled, credit will be tested individually for each single vend within the jug vend. Default = NO

e. HARDWARE SETTINGS

This sub menu allows some machine components to be disabled to allow limited functionality to be restored in the event of a failure. For example in the event that one of the cup sensor PCBs fails, it is possible to inform the control system that these are not fitted. Likewise in the event of a brewer failure setting the COFFEE BREWER to NO will allow any selections not reliant on the brewer to operate. Whilst all possible system components are visible in this sub menu, irrespective of the machines configuration, it is only meaningful to ENABLE components that actually exist in the machine. Thus it makes no sense to set TEA BREWER to YES on an all-instant machine and indeed will result in an IO MAPPING ERROR.

Parameter	**Function**
CUP SENSORS	Enable disable user cup sensors default is YES sensors fitted.
DISPENSE ARM	Enable moving dispense head. Default is YES. Can be usefully disabled only for diagnostics. The machine cannot operate with this item deselected.
TEA BREWER	Enable Tea brewer – Default for fresh brew machine configurations is YES for Instant configurations NO.
COFFEE BREWER	Enable Coffee brewer – Default for double fresh brew configurations is YES. Instant and single fresh brew configurations NO.
COLD UNIT	Indicates the type of cold drinks unit Installed. Possible values are: o HOT ONLY o CARBONATOR o CHILLER
NO CUP MECH	Allows a machine to operate without a cup unit fitted i.e. reliant on users providing their own cups. Default is NO i.e. there is a cup mechanism fitted

MDB CONFIG

26. This menu provides the means to modify parameters related to MDB peripherals connected to the machine. At present these are limited to those associated with a change giving coin mechanism. However as support for additional peripherals is added so additional settings will be added as appropriate.

The following table lists the sub menus and parameters that are configurable:

Parameter	Description
MAX CREDIT	This monetary value defines the largest amount that can be accepted by the mechanism. Once the displayed credit reaches the value set in MAX CREDIT no further coins will be accepted
EXACT CHANG LIM	This monetary value represents the value of coins remaining in the change tubes below which the EXACT CHANGE message is displayed. Note for the audit system to work correctly it is important that all coins are inserted via the coin insert slot. Ie not placed directly in the change tubes.
VEND BEFORE CHANGE	Possible values are YES and NO. When set to YES change will not be given until a vend cycle has taken place.
CHANGER MODE	Possible values are SINGLE VEND and MULTI VEND When set to MULTI VEND change will only be paid in response to depression of the escrow lever. When set to SINGLE VEND change will be given automatically following the vend cycle or in response to depression of the escrow lever.
AUTO CONFIGURE ACCEPTANCE MASKS	This utility auto-configures the coin acceptance masks to match the coin changer being used. The EXACT CHANGE mask is configured to accept only the coins that can be routed to the changer's tubes, and the NORMAL mask is configured to accept any coin which the changer accepts.
ENABLED COINS EXACT CHANGE	This variable controls which coins are accepted in circumstances where the exact change message would be displayed. The MDB protocol provides for up to 16 coins. For the purposes of enabling or disabling acceptance, the coins are represented by the letters A through to P with A being the least value coin. The acceptance status of each coin is shown by a 1 or 0 below the corresponding letter. One indicates acceptance and zero rejection. PONMLKJIHGFEDCBA 0000000000000000111 Applied to a silver only changer with 5,10,20 & 50p coin tubes the above setting will enable acceptance of the 5, 10 & 20p coins.
ENABLED COINS NORMAL	This variable controls which of the coins that an attached changer is programmed to accept should actually be accepted in normal operation i.e. other than exact change mode. For the purpose of changing the coins to be accepted the procedure is the same as for Enable Coins Exact Change above.

ENABLED NOTES EXACT CHANGE	This variable controls which notes are accepted in circumstances where the exact change message would be displayed. The MDB protocol provides for up to 16 types of note. For the purpose of changing the notes to be accepted the procedure is the same as for Enable Coins Exact Change above.
ENABLED NOTES NORMAL	This variable controls which of the notes that an attached validator is programmed to accept should actually be accepted in normal operation i.e. other than exact change mode. For the purpose of changing the notes to be accepted the procedure is the same as for Enable Coins Exact Change above.

EVA-DTS CONFIG

27. The EVA-DTS configuration menu provides the means to modify parameters controlling the format and method of auditing the machine. At the time of writing the machine supports EVA-DTS audit using DDCMP by either direct connect or IRDA transceiver, DEX-UCS by direct connect or Coffetek Smart card. A simple ASCII print output is also provided. The sub-menus of this menu are:

a. PREVIOUS AUDIT

On selecting this option the LCD screen will show a screen detailing the time and date of the last audit. The layout of the screen is as show below

```
NO:XXXX  ID:YYYYYY
DD/MM/YY   00:00
```

Where

- XXXX represents the audit number maintained by the vending machine and incremented after each audit.
- YYYYY represents the data carrier ID.
- DD/MM/YY is the date the audit took place.
- hh:mm is the time at which the audit took place.

b. METHOD OF AUDIT

Parameter	**Description**
AUDIT METHOD	Possible values are DDCMP, DEX-UCS, CARD, PRINTED AUDIT or DISABLED. DDCMP selects infrared or direct connect audit. DEX-UCS and PRINTED AUDIT select direct connect, CARD selects the smart card interface. DISABLED turns off the audit system.

c. AUDIT CONFIG

Parameter	**Description**
SECURITY CODE	Default 0 – Any data carrier may audit the machine The code is set by a data carrier. Once set by a carrier only a carrier with the appropriate code may access the machine.
PASS CODE	Default 0 – Any data carrier may audit the machine The code is set by a data carrier. Once set by a carrier only a carrier with the appropriate code may access the machine.
STATION ADDRESS	Default 7 – Identifies the unit as a VMC for audit purposes.

Section 4

Installation & Commissioning

Introduction

1. The information given in this Section covers installation, commissioning and maintenance procedures for the Studio Line Beverage Machine. Authorised personnel, who are fully conversant with the equipment, using only the manufacturer's approved parts, must carry out these procedures.

2. Servicing personnel must be familiar with the SAFETY WARNINGS listed on page before undertaking any installation, commissioning or maintenance procedure on the beverage machine. Any procedure, which is found to be impracticable, inadequate or inaccurate, should be reported to the Management for further investigation.

3. The requirements of proper hygiene in respect of food products must be ensured at every level of contact with the beverage machine and the ingredients associated with it.

SAFETY WARNINGS

1. Maintenance of the beverage machine is only to be undertaken by trained personnel who are fully aware of the dangers involved and who have taken adequate precautions, e.g. ensuring that, whenever possible, the beverage machine is isolated from the mains electrical supply.

2. Lethal voltages are exposed when any panel inside the cabinet is removed and the mains electrical supply is available (i.e. on/off switch is overridden). The mains electrical supply is maintained to the Carbonator even when the door is open.

3. The beverage machine must be earthed.

4. Keep clear of the Brewer Unit when it is indexing.

5. The beverage machine is a heavy item. Ensure that sufficient personnel are available for lifting and transporting the machine. Use proper lifting procedures and equipment.

6. The water in the heater tank, and the tank itself, are hot enough to scald or burn, even some time after the machine has been switched off. The water heater tank must be drained, filled with cold water and drained again before any attempt is made to handle it or any of its associated parts.

7. The Controller Board is fitted with a lithium battery. Abuse of this type of battery can lead to overheating, venting, explosion, release of potentially hazardous materials and spontaneous ignition.

   The lithium battery must not be charged or connected to any other source of power. The battery must not be short-circuited or forced to discharge its stored energy. The battery must not be subjected to physical damage or overheating. If the Controller Board is to be replaced, it must be handled with care, taking all practical anti-static precautions.

SERVICES REQUIRED, WEIGHT AND DIMENSIONS

4. (a) Electrical Supply: 24OV, 5OHz, 13A fused.

   (b) Water Supply: 15mm BSP stopcock - 1 bar min, 8 bar max.
   A double check valve MUST be fitted and for Hot and Cold Still Machines a 35psi regulator must be fitted.

INSTALLATION

WARNINGS

(1) THE BEVERAGE MACHINE IS A HEAVY ITEM. ENSURE THAT SUFFICIENT PERSONNEL ARE AVAILABLE FOR LIFTING AND TRANSPORTING THE MACHINE. USE PROPER LIFTING PROCEDURES AND EQUIPMENT.

(2) ENSURE THAT THE MAINS ELECTRICAL SUPPLY IS ISOLATED BEFORE CONNECTING THE ELECTRICAL SUPPLY CABLE TO THE MACHINE.

(3) ENSURE THAT THE MAINS WATER SUPPLY IS ISOLATED BEFORE CONNECTING THE WATER SUPPLY HOSE TO THE MACHINE.

(4) THE BEVERAGE MACHINE MUST BE EARTHED.

(5) DO NOT EARTH THE BEVERAGE MACHINE TO THE MAINS WATER SUPPLY PIPE.

LOCATION

5. Locate the beverage machine close to the appropriate electrical and water services, with a minimum of 100mm (4in) clearance between the rear of the cabinet and the wall to allow adequate ventilation. If situating in a corner location, do not install closer to the right hand wall less than 400mm (16in) to accommodate opening of the door.

LEVELLING

6. The machine should be levelled both fore and aft and side-to-side by adjustment of the four levelling feet, using a spirit level on the cabinet floor to check for level. Incorrect levelling of the machine can result in cup drop failures, door misalignment and Coin Mechanism malfunctions.

CONNECTING THE WATER SERVICES

7. The water supply should be taken from a 15mm rising main at a pressure of between 1 to 8 bar and should be fitted with a stopcock to isolate the supply during servicing. A double check valve must be fitted to the machine and when installing a Hot/Cold still machine, a water pressure regulator set at 35psi should be fitted.

8. The outlet should be fitted with BSP connections and must be positioned within 1.5m of the machine to ensure correct fitting of the hose. If possible, the outlet should be located behind the machine to prevent misuse.

9. Before connecting the machine hose to the mains outlet, flush the system via the stopcock to remove any impurities, which may have accumulated in the mains supply pipe.

10. Connect the machine hose to the mains outlet using the seals supplied and ensure that all fittings are tight. Turn on the water supply at the stopcock and check for leaks, both behind and inside the machine.

CONNECTING THE ELECTRICAL SERVICES

11. The beverage machine mains cable is fitted with a moulded 13A fused plug and is connected:

    - GREEN and YELLOW wire to the EARTH terminal (E)
    - BLUE wire to the NEUTRAL terminal (N)
    - BROWN wire to the LIVE terminal (L)

12. Connect the mains cable plug to a switched 24OV, 5OHz, 13A supply socket. Preferably, the switched outlet should be located behind the machine to prevent accidental damage or misuse. With the plug fitted to the socket, ensure that the cable is not being stretched, distorted or fouled.

COMMISSIONING

WARNINGS

(1) LETHAL VOLTAGES ARE EXPOSED WHEN ANY PANEL INSIDE THE CABINET IS REMOVED AND MAINS ELECTRICAL SUPPLY IS AVAILABLE (I.E. ON/OFF SWITCH IS SWITCHED ON).

(2) MAINS ELECTRICAL SUPPLY IS MAINTAINED TO THE CARBONATOR EVEN WHEN THE DOOR IS OPEN.

(3) THE WATER IN THE WATER HEATER IS HOT. AVOID CONTACT WITH WATER LEAKING FROM THE HEATER OR FROM ITS ASSOCIATED VALVES, TUBES AND PIPES.

(4) KEEP CLEAR OF THE BREWER UNIT WHEN IT IS INDEXING.

13. It is essential that the Service Engineer responsible for installing and commissioning the machine ensures that:

    (1) all electrical and water supplies are correctly and safely connected;

    (2) all covers, panels or access doors are in place and secured, and the machine is left in a SAFE condition;

    (3) the Operator is familiar with the SAFETY PRECAUTIONS for the machine.

    (4) the importance of hygiene and regular cleaning is fully appreciated by the Operator.

14. With the water and electrical supplies available to the machine, check the operation of the water heater as follows:

    (1) Isolate the mains electrical supply from the machine.

    (2) Open the cabinet door and check that the on/off switch is in the OFF position.

    (3) Remove the ingredient canisters and back panels.

    (4) Ensure that the water heater overflow pipe is not trapped.

    (5) Restore the electrical supply to the machine.

    (6) Using the main switch, set to the ON position.

    (7) Check that the water heater fills with water and that the water supply cuts off when the correct level is reached, i.e. no water overflows into the waste bucket. Ensure that the waste level probe is located in the waste bucket.

    (8) Set the main switch to the OFF position.

WARNING

LETHAL VOLTAGES ARE EXPOSED WHEN ANY PANEL INSIDE THE CABINET IS REMOVED AND MAINS ELECTRICAL SUPPLY IS AVAILABLE (I.E. ON/OFF SWITCH IS SWITCHED ON).

15. Prepare the Carbonator for use as follows:

(1) Isolate the mains electrical supply from the machine.

(2) Remove the front and top covers from the Carbonator, fit the small waste bucket in position in the cabinet and place the Carbonator overflow pipe in the bucket.

(3) Slowly fill the Carbonator water reservoir with cold water up to the overflow level.

(4) Purge the Carbonator of air by opening the shut-off valve for approximately 5 seconds.

(5) Using the seals provided, connect the regulator to the $C0_2$ gas cylinder and check that the $C0_2$ gas pressure is set at 50psi. Secure the cylinder in place in the cabinet.

(6) Turn on the $C0_2$ gas supply and purge the Carbonator by gently lifting the pressure relief valve for approximately 10 seconds.

(7) Place the waste level probe in the waste bucket and refit the front and top covers to the Carbonator.

(8) Restore the mains electrical supply to the machine.

(9) Place the syrup container in the cabinet and insert the stainless steel dip tubes into the container.

Section 5

Setting up a New or Replacement Control Board

The 54955 FMCU Control board used in the Studio Line Vending machine utilises static sensitive components. Precautions for handling static sensitive devices should be observed when handling this item.

The Studio Line control board is programmable on two levels. At the lowest level the board's Flash memory, (firmware), can be reprogrammed to enable a wide range of different machines to be controlled. This level of programming requires a PC and special interface equipment and is essentially a factory / main base activity. The firmware programmed into a board can be read from the label fitted to the component side of the board or if placed in a functioning machine using the Machine Status menu, ref section 3 paragraph K.

For Studio Line machines the software version will typically be of the form STUDIO2_XX. Where STUDIO2_ denotes the program and XX is a number defining the version. New versions will be generated to support customer specific configurations and behaviours. It is therefore important to **check that the firmware programmed into a board is appropriate to the machine to which it is to be fitted,** as older versions may not support a particular machine type.

The second level of programming involves setting up the board to operate the correct predefined menu configuration for the machine to which it is fitted. This section details the procedure to be to achieve this.

- Switch of the machine
- Fit the new board and plug in all the connectors. It is not possible to put connectors in incorrectly as the plug sizes prevent this.
- Fit the shorting link between the pins CLK BAT to enable the battery support for the clock.
- Fit a shorting link between the pins labelled ENG LINK.
- Turn on the power
- The display will prompt for an ACCESS CODE either press ENTER or wait – The display will eventually change to INGREDIENT TIMES
- Select the Appropriate configuration from within the SET MACHINE TYPE sub menu of the CONFIGURE menu using the procedures described in section 3.
- Remove the shorting link from the ENG LINK pins.
- Switch the machine off and on
- Re Enter programming mode using the default code (4444)
- Enable the MDB protocol if a coin / card system is fitted.
- Set up the Operator and Manager level codes if different from the default.
- Finally adjust the drink settings as required and test each selection.

STUDIO II DFB SHEET 1 OF 3

NO.	QTY.	DESCRIPTION	PART NUMBER
1	1	Motor shelf	67655
2	1	Canniester shelf	67656
3	1	Main panel	67657
4	1	Extract duct	67658
5	1	Whipper base	67734
6	7	Ing motor 120rpm	54930
7	1	Tea pot coil	68157
8	1	Coffee brewer red lever	89020
9	1	12 oz rh tea brewer	88100
10	3	Whipper chamber grey	54658
11	3	Steam trap grey	54662
12	5	O-ring	54653
13	3	Mix bowl inlet pipe grey	54656
14	3	Impelor disk grey	54652
15	4	O-ring black 33.05X1.78	54650
16	3	Whipper base grey	84665
17	4	Whipper motor	54645
18	3	Motor rerainer grey	54649
19	1	Whipper chamber black cu	84659
20	1	Mix bowl inlet pipe black	54654
21	1	Whipper chamber brown	54657
22	1	Impelor disk brown	54751
23	1	Whipper seal	54767
24	1	Whipper base brown	84664
25	1	Mix bowl inlet pipe brown	54655
26	1	Steam trap brown	54661
27	1	Motor rerainer brown	54749
28	1	Coffee canister	56140
29	1	Canister plastic auger	59059
30	5	Canister 64mm wire auger	59204
31	1	Canister label decaf/nat	28128
32	1	Canister label chocolate	28209
33	1	Canister label coffee	28210
34	1	Canister label tea	28211
35	1	Canister label milk	28212
36	1	Canister label sugar	28214
37	1	Canister label topping	28220
38	4	L/h chute	56037
39	2	R/h chute	56032
40	1	Ingredient chute central	56028
41	1	Agitator small wire auger	55187
42	1	LCV tea chute	67886

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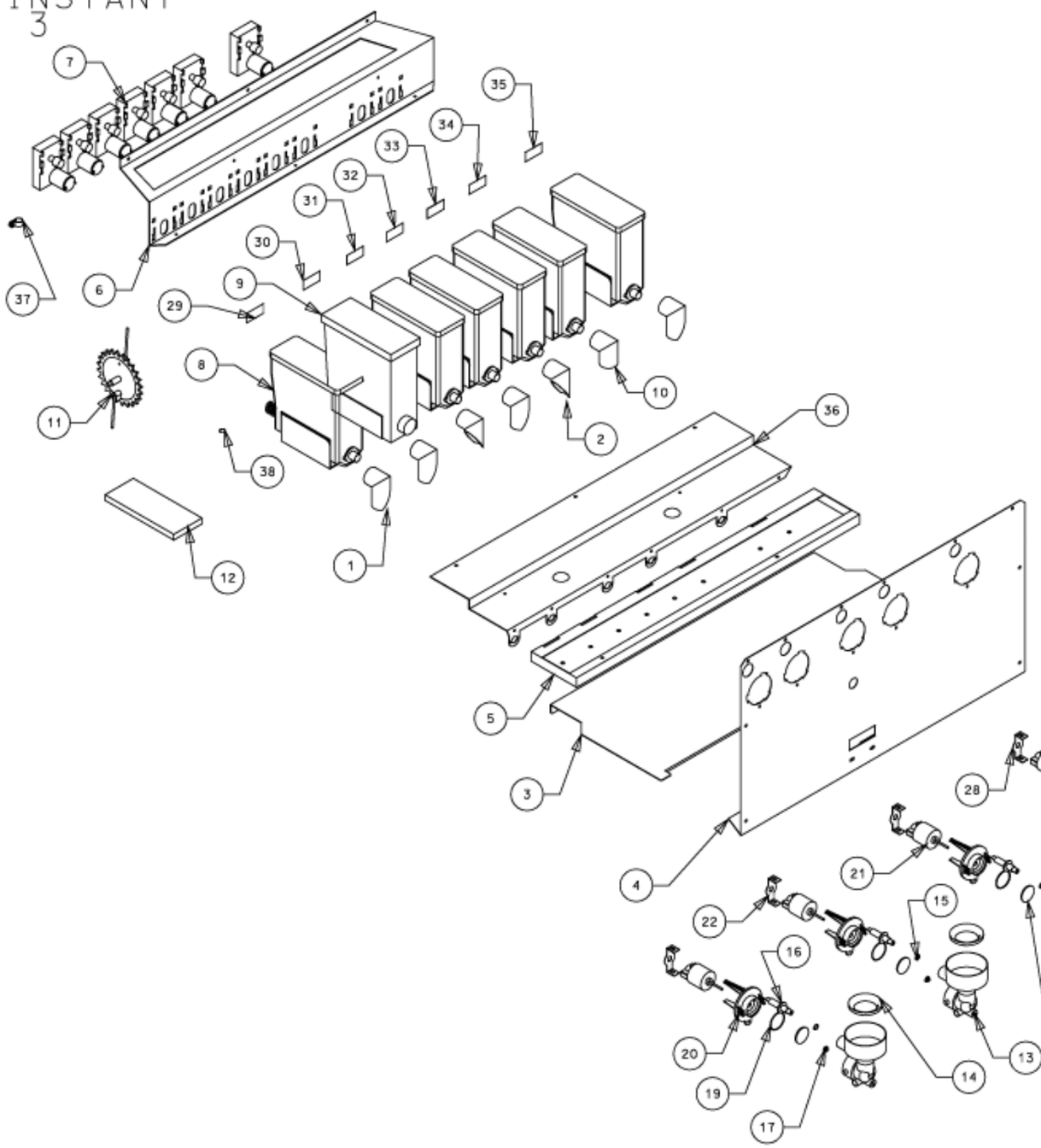
STUDIO II INSTANT
SHEET 1 OF 3



NO.	QTY.	DESCRIPTION	PART NUMBER
1	4	L/h chute	56037
2	2	R/h chute	56032
3	1	Whipper base	67734
4	1	LCV instant main panel	67954
5	1	Extract duct	67955
6	1	Motor shelf	67655
7	7	Ing motor 120rpm	54930
8	6	Canister 64mm wire auger	59204
9	1	Canister plastic auger	59059
10	1	Ingredient chute central	56028
11	1	Agitator small wire auger	55187
12	1	Canister lid 59204 & 590	59204L
13	3	Whipper chamber grey	54658
14	3	Steam trap grey	54662
15	5	O-ring	54653
16	3	Mix bowl inlet pipe grey	54656
17	5	Whipper seal	54767
18	3	Impelor disk grey	54652
19	5	O-ring black 33.05X1.78	54650
20	3	Whipper base grey	84665
21	5	Whipper motor	54645
22	3	Motor retainer grey	54649
23	2	Whipper chamber beige	55215
24	2	Steam trap beige	55214
25	2	Impellor disk beige	55242
26	2	Mix bowl inlet pipe beige	55241
27	2	Whipper base beige	85247
28	2	Motor retainer beige	55243
29	1	Canister label decaffinat	28128
30	1	Canister label chocolate	28209
31	1	Canister label coffee	28210
32	1	Canister label tea	28211
33	1	Canister label milk	28212
34	1	Canister label sugar	28214
35	1	Canister label topping	28220
36	1	Cannister shelf	67959
37	1	P clip NX5	54789
38	1	O ring plastic aug	56222

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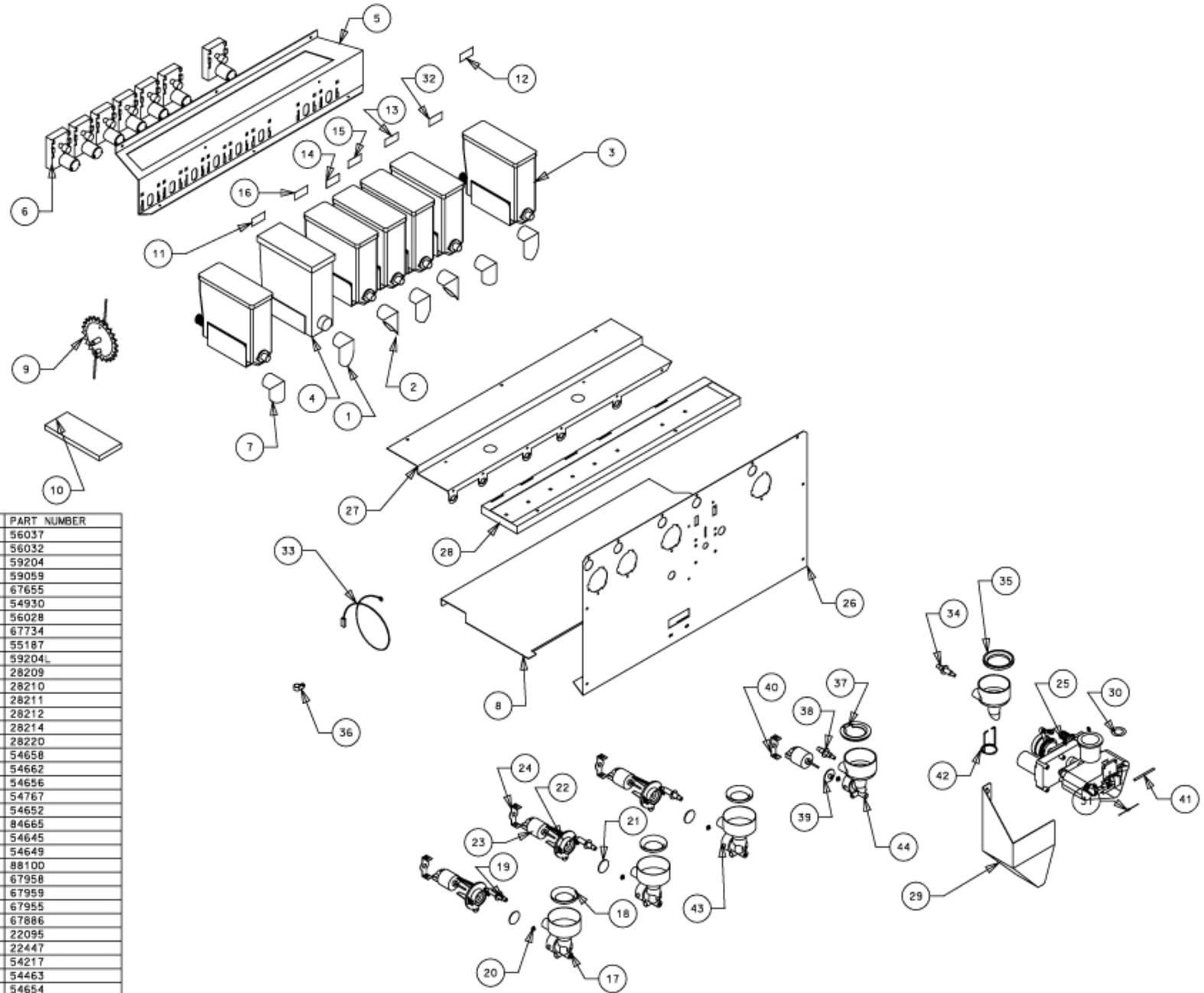
STUDIO SEB TEA
SHEET 1 OF 3



NO.	QTY.	DESCRIPTION	PART NUMBER
1	3	L/h chute	56037
2	2	R/h chute	56032
3	6	Canister 64mm wire auger	59204
4	1	Canister plastic auger	59059
5	1	Motor shelf	67655
6	7	Ing motor 120rpm	54930
7	2	Ingredient chute centrci	56028
8	1	Whipper base	67734
9	1	Agitator small wire auger	55187
10	1	Canister lid 59204 & 590	59204L
11	1	Canister label chocolate	28209
12	1	Canister label coffee	28210
13	1	Canister label tea	28211
14	1	Canister label milk	28212
15	1	Canister label sugar	28214
16	1	Canister label topping	28220
17	3	Whipper chamber grey	54658
18	3	Steam trap grey	54662
19	3	Mix bowl inlet pipe grey	54656
20	4	Whipper seal	54767
21	3	Impelor disk grey	54652
22	3	Whipper base grey	84665
23	4	Whipper motor	54645
24	3	Motor retainer grey	54649
25	1	12 oz rh tea brewer	88100
26	1	Main panel	67958
27	1	Cannister shelf	67959
28	1	Extract duct	67955
29	1	LCV tea chute	67886
30	1	Tea brewer silicone seal	22095
31	1	Capacitor ceramic 1uf F/V	22447
32	1	Canister label soup	54217
33	1	Earth link pacific	54463
34	1	Mix bowl inlet pipe black	54654
35	1	Steam trap black	54660
36	1	P clip NX5	54789
37	1	Steam trap beige	55214
38	1	Mix bowl inlet pipe beige	55241
39	1	Impellor disk beige	55242
40	1	Motor retainer beige	55243
41	1	Lcv tea bar	67964
42	1	Tea pot coil	68157
43	1	Whipper chamber beige	55215
44	1	Whipper chamber black cu	84659

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STUDIO II BEAN TO CUP SHEET 1 OF 3

NO.	QTY.	DESCRIPTION	PART NUMBER
1	6	1ng motor 120rpm	54930
2	5	Canister 64mm wire auger	59204
3	4	L/h chute	56037
4	2	R/h chute	56032
5	1	Motor shelf	67655
6	1	Whipper base	67734
7	1	Coffee brewer red lever	89020
8	1	Whipper chamber black cu	84659
9	4	O-ring	54653
10	1	Mix bowl inlet pipe black	54654
11	1	Coffee canister	56140
12	1	Canister plastic auger	59059
13	1	Canister label decaffinat	28128
14	1	Canister label chocolate	28209
15	1	Canister label coffee	28210
16	1	Canister label tea	28211
17	1	Canister label milk	28212
18	1	Canister label sugar	28214
19	1	Canister label topping	28220
20	1	Ingredient chute central	56028
21	1	Agitator small wire auger	55187
22	1	LCV tea chute	67886
23	1	Tea pot asli	68157
24	1	12 oz rh tea brewer	68100
25	1	Extract dust	68164
26	1	Microswitch bracket	68167
27	1	Main panel	68590
28	1	Grinder mount	68591
29	1	Grinder mount cover	68592
30	1	Coffee guard	68593
31	1	Canister shelf	68594
32	1	microswitch guard	68595
33	1	Hopper holder	68596
34	1	Holder cover	68597
35	1	Tea brewer silicone seal	22095
36	1	Capacitor ceramic 1uf F/V	22447
37	1	Earth link pacific	54463
38	1	"f" piece coffee brewer	54910
39	1	Brewer spout Nu/Ver/Pac	54924
40	3	4mm pin bullet	55639
41	1	Coffee chamber lid	56353
42	1	Lcv tea bar	67964
43	1	Dispense tube 3 way	55427
44	1	Front flange plastic aug	59023
45	1	Grinder	56642
46	1	Canister bracket	56993
47	1	Bean hopper	56643
48	1	Relay bean grinder	56653
49	1	Crimp female 18-24 awg	58017
50	1	Whipper chamber yellow	56548
51	2	Mix bowl inlet pipe yell	56549
52	1	Impelor disk yellow	56550
53	1	Motor retainer yellow	56552
54	1	Whipper base yellow	56550
55	1	Chute extension	56961
56	3	Whipper chamber grey	54658
57	3	Steam trap grey	54662
58	3	Mix bowl inlet pipe grey	54656
59	3	Impelor disk grey	54652
60	3	O-ring black 33.05X1.78	54650
61	3	Whipper base grey	84665
62	3	Whipper motor	54645
63	3	Motor retainer grey	54649

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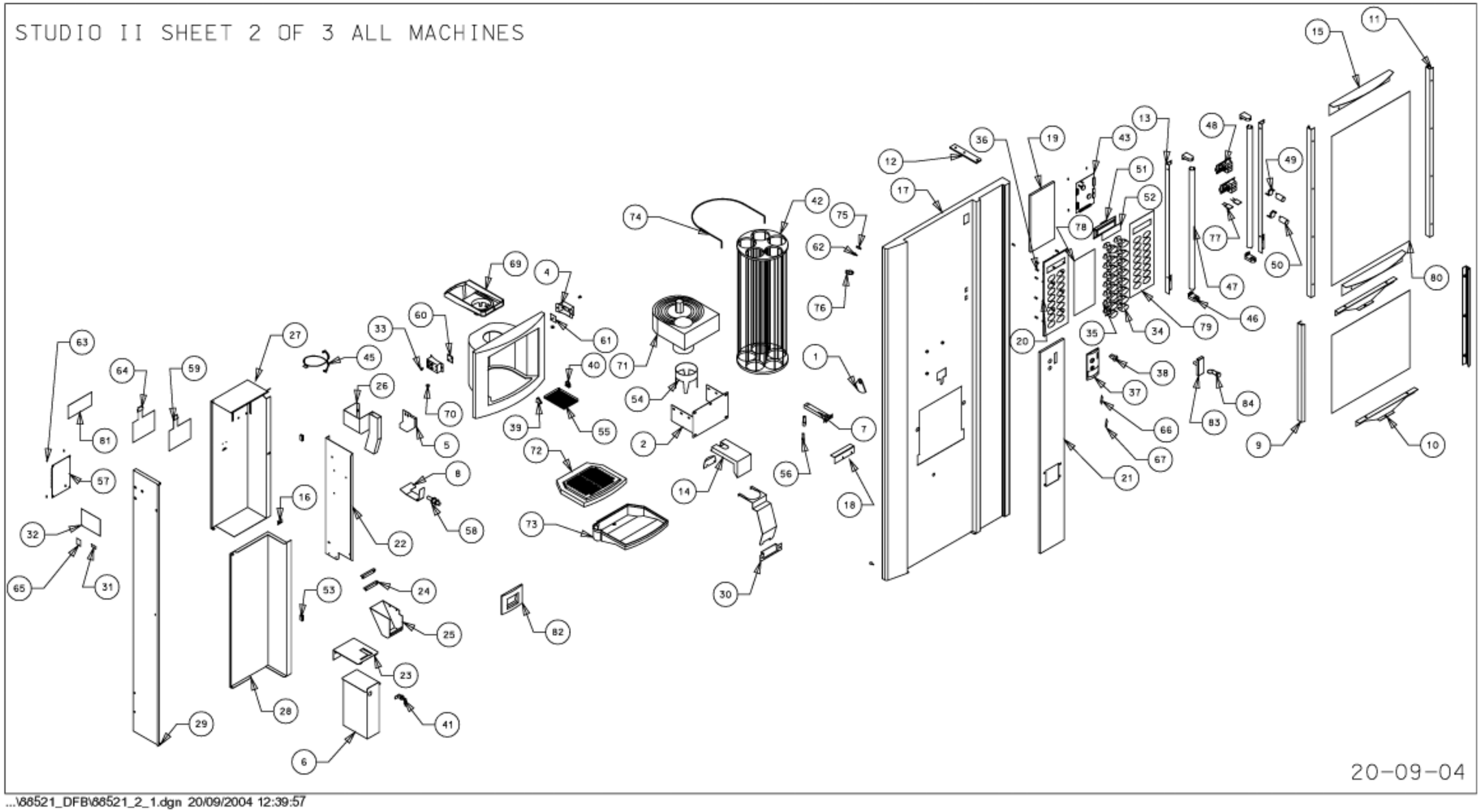

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STUDIO II SHEET 2 OF 3 ALL MACHINES

NO.	QTY.	DESCRIPTION	PART NUMBER	NO.	QTY.	DESCRIPTION	PART NUMBER
1	2	Lock cam	61713	43	2	Controller mpu sl	54955
2	2	Cup turret bracket	66621	44	2	Overflow sensor bracket	55130
3	2	Drip catcher	66676A	45	2	Internal keypad loom	55136
4	4	Eye sensor bracket	66680	46	8	Bernlight 28501 lamphold	55143
5	2	L.C.V coin chute	67752	47	4	Flour tube white	55144
6	2	L.C.V. cash box	67756	48	4	Bernlite EC18 choke	55145
7	2	LCV bucket sensor bracket	67887	49	4	Starter lamp holder	55146
8	2	Reject lever LCV	67945	50	4	Bg fsu 4-65w starter	55147
9	4	Bottom picture guide	68059	51	2	Chip on glass LCD PCB	55264
10	4	Picture supports coffee	68060	52	2	Chip on glass lcd	55272
11	4	Top picture guide	68061	53	4	Door magnet	55341
12	2	Top hinge plate coffee f	68062	54	2	Skirt cup drop black	55405
13	4	Light bracket	68076	55	2	Cup stand	55544-
14	2	Drip tray holder	68113	56	2	Front bucket sensor	55620
15	4	Picture infill panel	68114	57	2	DC rio board	55676
16	2	Door cover bracket	68203	58	2	Reject button	55947
17	2	Studio2 door	68505	59	2	Keypad circuit only	55960
18	2	Door lock plate	68506	60	2	Cup sensor receiver	56022
19	2	Top infill panel	68507	61	2	Cup sensor sender	56023
20	2	Button panel st2	68508	62	4	Door buffer rubber verona	56053
21	2	Bottom infill panel s2	68509	63	16	Board support long deep	56271
22	2	Coin mech bracket	68510	64	2	Keypad decal studio	56393
23	2	Cash box guide	68511	65	2	Warning label	56399
24	4	Coin catch bracket	68512	66	2	Coin decal studio silver	56433
25	2	Coin catcher	68513	67	2	Coin decal studio copper	56434
26	2	Reject chute	68514	68	2	Cup housing	56442
27	2	Top door cover	68515	69	2	C/f cup holder eng	56484
28	2	Bottom door cover	68516	70	4	Eye sensor lens small	59065
29	2	Door cover support	68517	71	2	Cup unit 24V DC uk 73mm	59332
30	2	Drip catcher	66676B	72	2	Drip tray grill	59339
31	2	Danger label warning disc	10064	73	2	Drip tray	59340
32	2	Danger live terminal lab	10070	74	2	24/7 carousel retainer	66668
33	4	Snap rivet black	22500	75	2	Door pin	67041
34	32	Button cap	54041A	76	2	Earth washer large	67068
35	32	Striker plate	54041B	77	4	Snubber assembly	86630
36	28	Keyboard spacer verona	54047	78	2	Studio 2 keyboard	56837
37	2	Coin bezel black new key	54174	79	2	Studio 2 kbd overlay	56838
38	2	Keyed switch 1 way	54175	80	2	Studio 2 picture 2 part	56941
39	2	Cup stand bracket lh	54193L	81	2	Caution label hands clear	56626
40	2	Cup stand bracket RHS	54193R	82	1	Coin flap and bezel	56945A
41	2	Lock cash box	54599	83	1	Door handle	56961B
42	2	Cup turret	54671	84	1	Lock barrel and key	56961C

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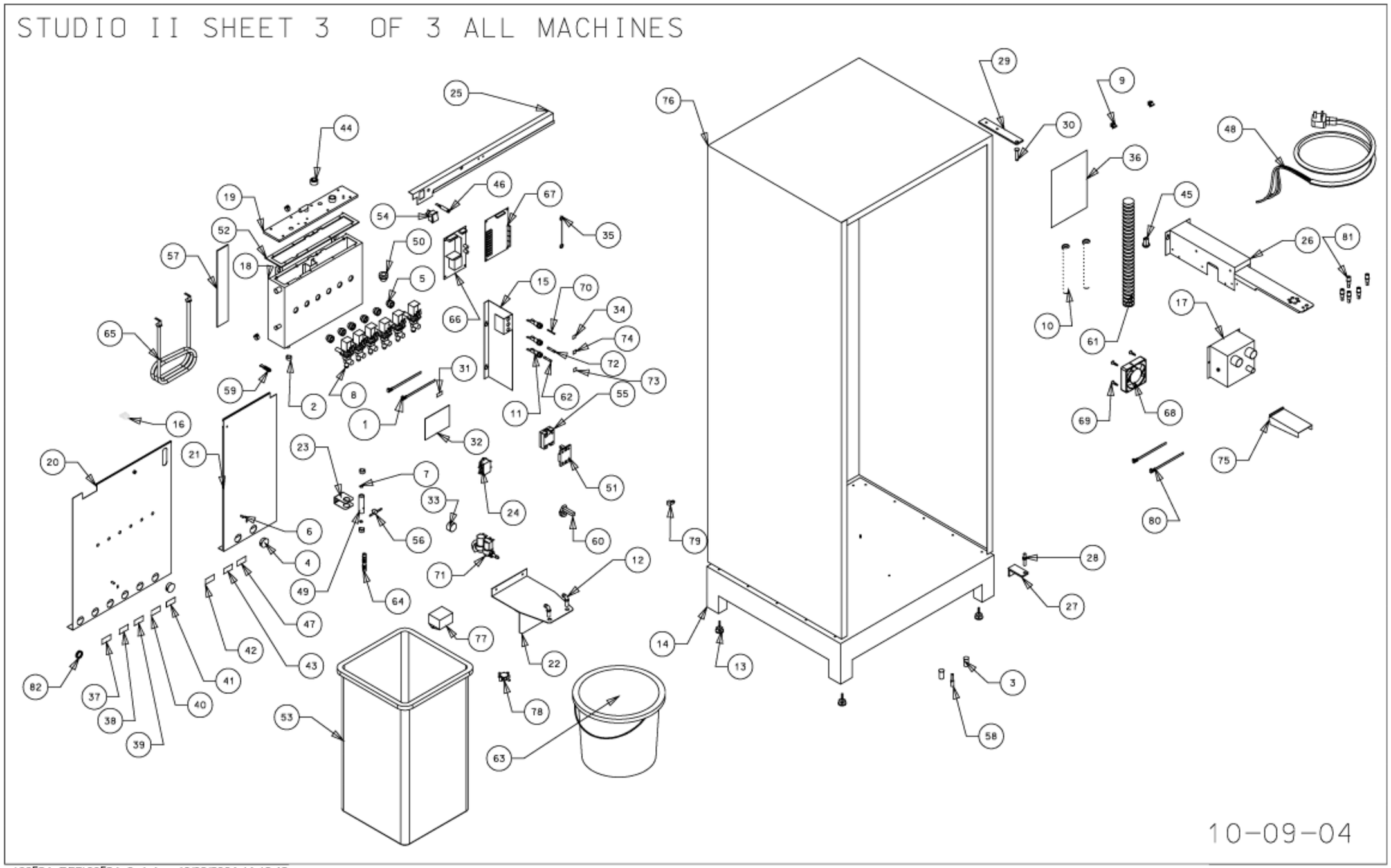
STUDIO II SHEET 3 OF 3 ALL MACHINES
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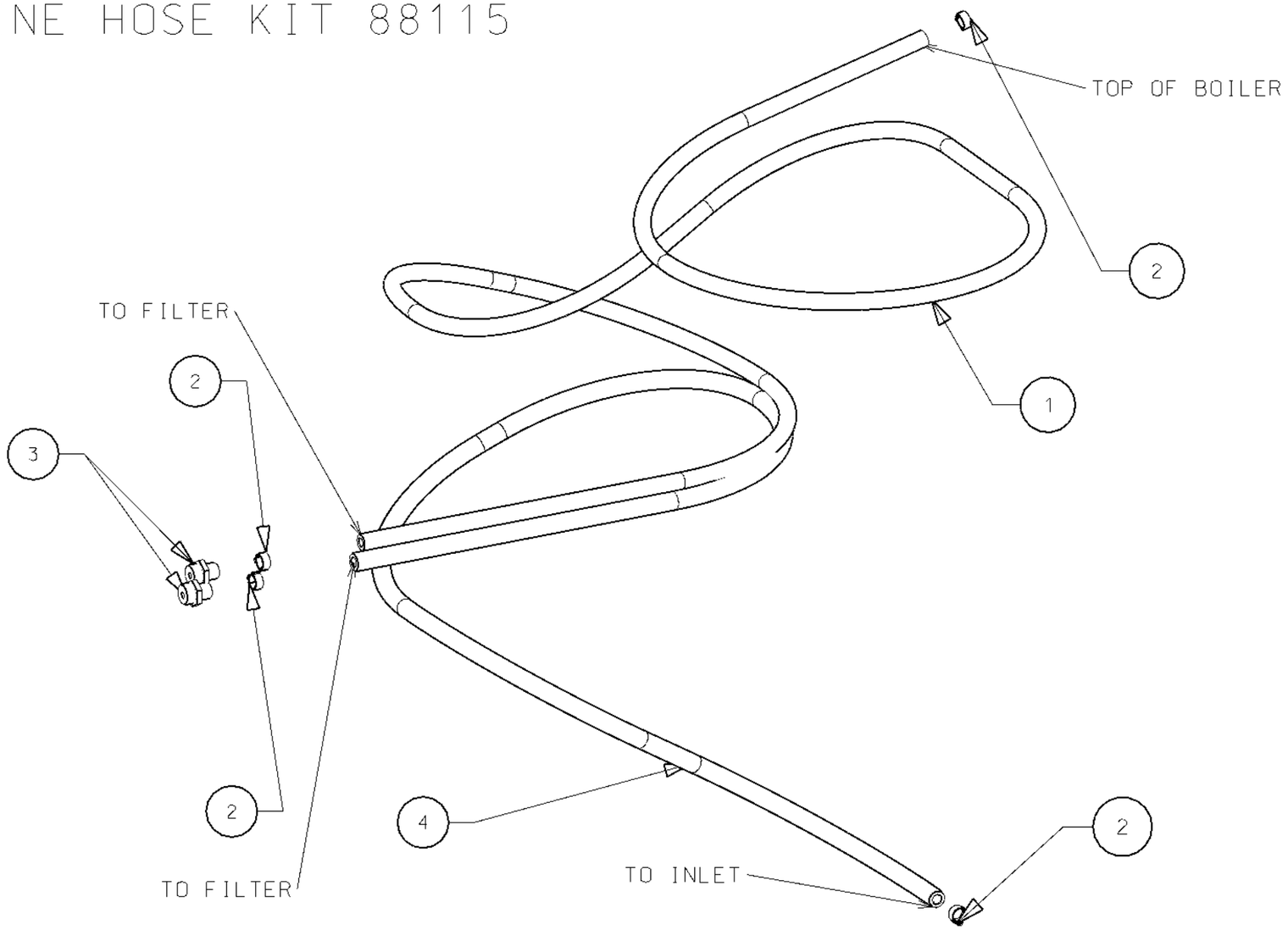
STUDIO II SHEET 3 OF 3 ALL MACHINES

NO.	QTY.	DESCRIPTION	PART NUMBER
1	2	Cable tie for boiler	22102
2	5	Cobra clip 14mm normal	54011
3	2	Bucket stop cover	54169
4	2	Blanking gromet	54211
5	6	Swaged port valve seal	54543
6	2	Boiler cover spacer vero	54626
7	2	O-ring	54653
8	6	Outlet valve 8mm 24vDC	55003
9	2	Tie wrap holder snap lock	55217
10	2	Black hose 16mm i/d	55768
11	3	16 amp fuseholder bussman	71101
12	2	2 large straights + 2 elb	55441-B
13	4	Feet m10x35mm	56253
14	1	Cabinet base	67654
15	1	Fuse panel	67661
16	1	Snapper clip no6	71730
17	1	L.C.V. fanbox	67757
18	1	Boiler	67759B
19	1	Boiler lid	67759L
20	1	L.C.V L/H boiler cover	67797
21	1	L.C.V. r/h boiler cover	67798
22	1	Bucket stop combi	67799
23	1	LCV cut out bracket	68012
24	1	Filter cap ser pac fn610	71599
25	1	Boiler cover holder	67653A
26	1	Dispense head assembly	87789
27	1	Bottom hinge plate	67653C
28	1	Bottom hinge pin	66617
29	1	Top hinge plate	67660
30	1	Top hinge pin	66616
31	1	Danger label warning disc	10064
32	1	Danger live terminal lab	10070
33	1	Dust cover for inlet val	20014A
34	1	F15 sticker	22022
35	1	Earth lead short	22058
36	1	Rating plate	28114
37	1	Canister label decafinat	28128
38	1	Canister label chocolate	28209
39	1	Canister label coffee	28210
40	1	Canister label tea	28211
41	1	Canister label milk	28212

NO.	QTY.	DESCRIPTION	PART NUMBER
42	1	Canister label sugar	28214
43	1	Canister label soup	54217
44	1	Valve port/probe 8mm seal	54048
45	1	Keyed switch 1 way	54175
46	1	Boiler neon	54210
47	1	Canister label topping	28220
48	1	UK mains lead with 13A p	54416
49	1	Cut out tube 338	54459
50	1	Blind swaged port seal	54544
51	1	S S R Terminal cover	54552
52	1	Boiler seal	54827
53	1	Bin 25 ltr	55419
54	1	Switch rocker on/off ver	55458
55	1	SS relay 240v	55466
56	1	Thermal cutout 85°	55528
57	1	Boiler foam pad	55551
58	1	Front bucket sensor	55620
59	1	Hose bung flangeless plug	55692
60	1	Mains lead device	55767
61	1	Hose 1 1/4 extra flex	55770
62	1	Fuse 5a 415v (t) 32mm cer	55808
63	1	Bucket 10Ltr	55854
64	1	Straight connector	55986
65	1	Boiler element	56155
66	1	Psu dc 100W	56374
67	1	DC rio board	55676
68	1	Extract fan sounon	55239
69	4	Pcbs black psu dc micro	59004
70	1	15A fuse	56114
71	1	24DC inlet valve	59255
72	1	Fuse 7A 240V	56156
73	1	T5A	22021
74	1	F7 label	22092
75	1	Dispense head shroud	68605
76	1	Cabinet	68522
77	1	Filter unit	54486
78	1	Diff pressure switch	54700
79	1	P clip NX5	54789
80	2	Cable tie re-usable	55748
81	5	Spout	56920
82	1	Grommet diaphram type	59139

10-09-04

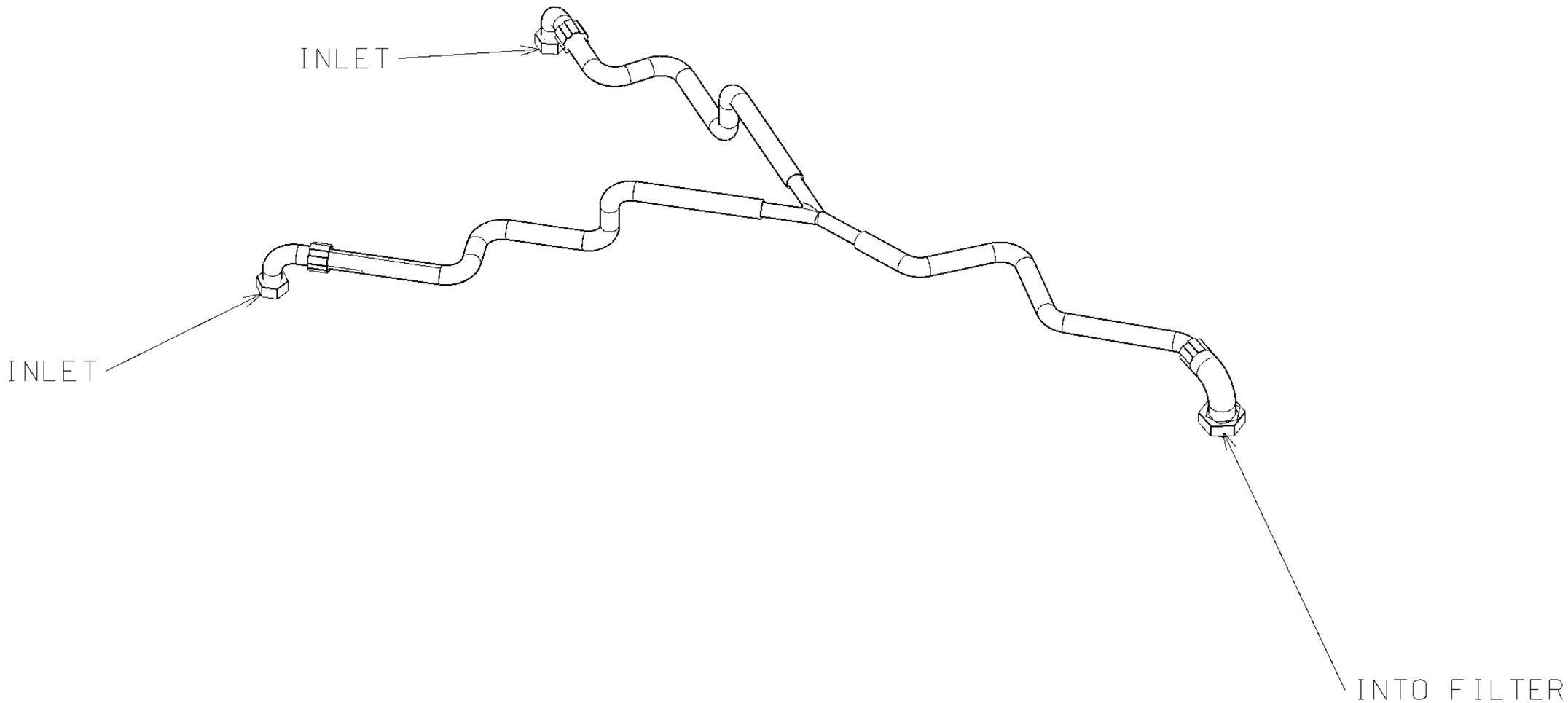
AP EVERPURE MACHINE HOSE KIT 88115



NO.	QTY.	DESCRIPTION	PART NUMBER
1	1	1.8m of braided silicone	54113
2	4	Cobra clip 14mm normal	54011
3	2	3/8 bsp to 3/8 spur	56569
4	1	1m aqua vend 10	54110

17/06/03

88110 AP EVERPURE COLD MACHINE HOSE KIT



18-06-03