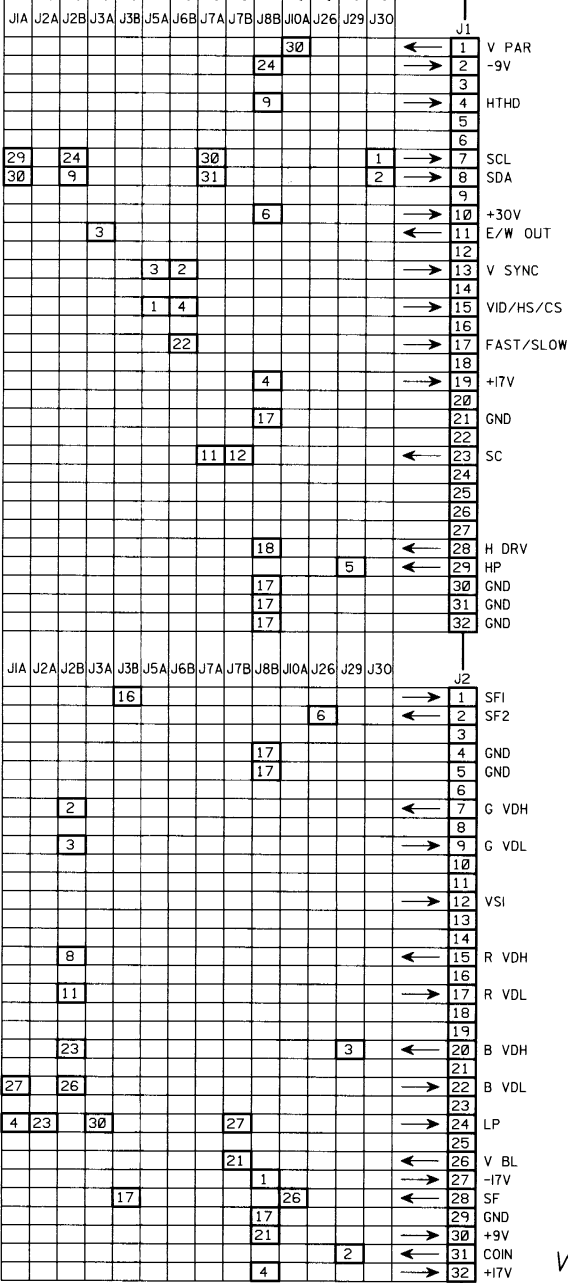
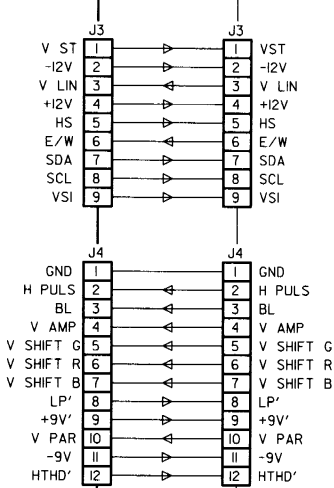


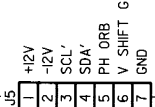
CONVERGENCE MODULE
HORIZONTAL SHIFT MODULE
HORIZONTAL SHIFT MODULE
HORIZONTAL DEFLECTION MODULE
SECOND HORIZONTAL DEFLECTION MODULE
RGB ANALOG INPUT MODULE
DECODER + RGB DRIVER MODULE
DECODER + RGB DRIVER MODULE
SWITCH MODE POWER SUPPLY MODULE
ELECTRICAL FOCUS + C2 + DIAGNOSTIC MODULE
DEFLECTION & CONVERGENCE COILS BLUE
CONTROLLER MODULE



VERTICAL DEFLECTION



SUB-UNIT VERTICAL DEFLECTION



ORBITING MODULE

To PORT 3

| | | |
|--------------------------|-------|-------------|
| Name Interconnection | | Article nr. |
| VERTICAL DEFLECTION | | 76 2269-3 |
| Date | Drawn | Checked |
| 22-11-1993 | JVDY | CHT |
| BARCO PROJECTION SYSTEMS | | |

| | |
|-----|----|
| C1 | C6 |
| C2 | C2 |
| F4 | F4 |
| C2 | C6 |
| C2 | C4 |
| C3 | D6 |
| C3 | D4 |
| C4 | G4 |
| C4 | G6 |
| C4 | D4 |
| C4 | E6 |
| C5 | C5 |
| C5 | D4 |
| C5 | G4 |
| C6 | D6 |
| C6 | D2 |
| C7 | D5 |
| C7 | F6 |
| C8 | C5 |
| C8 | D2 |
| C9 | F5 |
| C9 | C6 |
| C10 | D3 |
| C10 | D5 |
| C10 | C1 |
| C10 | F6 |
| C11 | D6 |
| C11 | C1 |
| C11 | F5 |
| C12 | D6 |
| C12 | C1 |
| C12 | F5 |
| C13 | D6 |
| C13 | C1 |
| C14 | C5 |
| C14 | D5 |
| C14 | E4 |
| C15 | C6 |
| C15 | D3 |
| C16 | C6 |
| C16 | D4 |
| C16 | F5 |
| C17 | C6 |
| C17 | D4 |
| C18 | D6 |
| C18 | D2 |
| C18 | F4 |
| C19 | C6 |
| C19 | B3 |
| C20 | F4 |
| C20 | D2 |
| C20 | F4 |
| C21 | B6 |
| C21 | D1 |
| C21 | G5 |
| C22 | D1 |
| C22 | F4 |
| C23 | D2 |
| C23 | F5 |
| C24 | B2 |
| C24 | G2 |
| C25 | C3 |
| C25 | G1 |
| C26 | C2 |
| C26 | G1 |
| C27 | C2 |
| C27 | C2 |
| C28 | C2 |
| C28 | F1 |
| C29 | F3 |
| C29 | F2 |
| C30 | C3 |
| C30 | E4 |
| C31 | B2 |
| C31 | E5 |
| C32 | D1 |
| C32 | G4 |
| C33 | D1 |
| C33 | C5 |
| C34 | C2 |
| C34 | F2 |
| C35 | C3 |
| C35 | G1 |
| C36 | D4 |
| C36 | F2 |
| C37 | C3 |
| C37 | F2 |
| C38 | D3 |
| C38 | C6 |
| C39 | C3 |
| C39 | C6 |
| C40 | C4 |
| C41 | C5 |
| C41 | G2 |
| C42 | C4 |
| C42 | F2 |
| C43 | C4 |
| C43 | F2 |
| C44 | C4 |
| C44 | F1 |
| C45 | C4 |
| C45 | F1 |
| C46 | C4 |
| C46 | F2 |
| C47 | D4 |
| C47 | F1 |
| C48 | C4 |
| C48 | F3 |
| C49 | C4 |
| C49 | F2 |
| C50 | B3 |
| C50 | F6 |
| C51 | C3 |
| C51 | F5 |
| C52 | C2 |
| C52 | C2 |
| C53 | C3 |
| C53 | F3 |
| C54 | C2 |
| C55 | C2 |
| C56 | C2 |
| C57 | C2 |
| C58 | C2 |
| C59 | F2 |
| C60 | F4 |
| C61 | F4 |
| C62 | F4 |

REMOVE WHEN
ON AXIS
PROJECTION

ADJUSTMENT
SYMMETRY
OF THE
PARABOLA

ADJUSTMENT
AMPLITUDE
OF THE
PARABOLA
FOR 4.5Vp/p
ON PIN 10 OF J4

OPEN CIRCUIT
DISABLE BLANKING
WHILE THERE IS
NO COINCIDENCE

LED ON :
NO COINCIDENCE

VERTICAL
AMPLITUDE
ADJUSTMENT
RED

VERTICAL
AMPLITUDE
ADJUSTMENT
BLUE

VERTICAL
SHIFT
ADJUSTMENT
BLUE

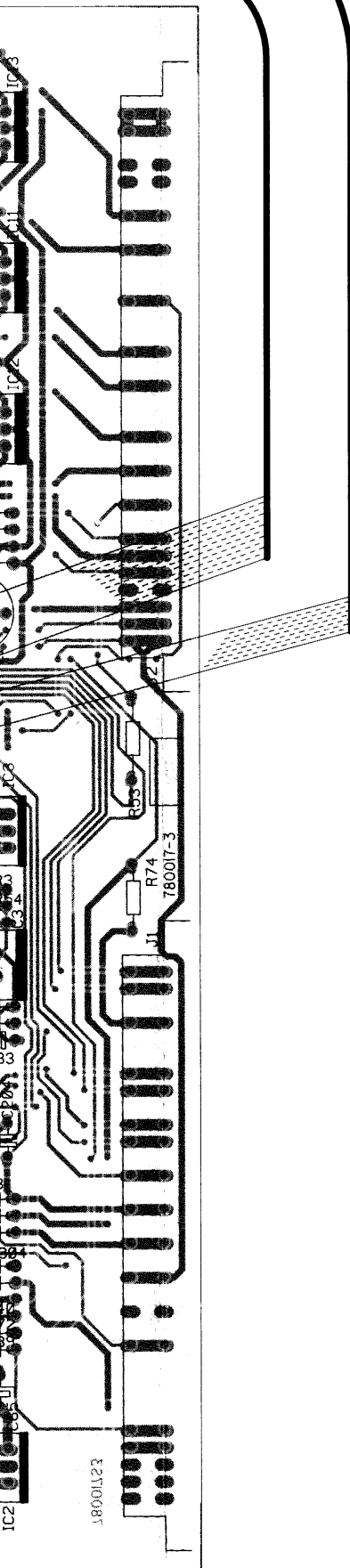
VERTICAL
SHIFT
ADJUSTMENT
RED

ADJUSTMENT
VERTICAL
HIGHER
OSCILLATOR
FREQUENCY
V HOLD-H

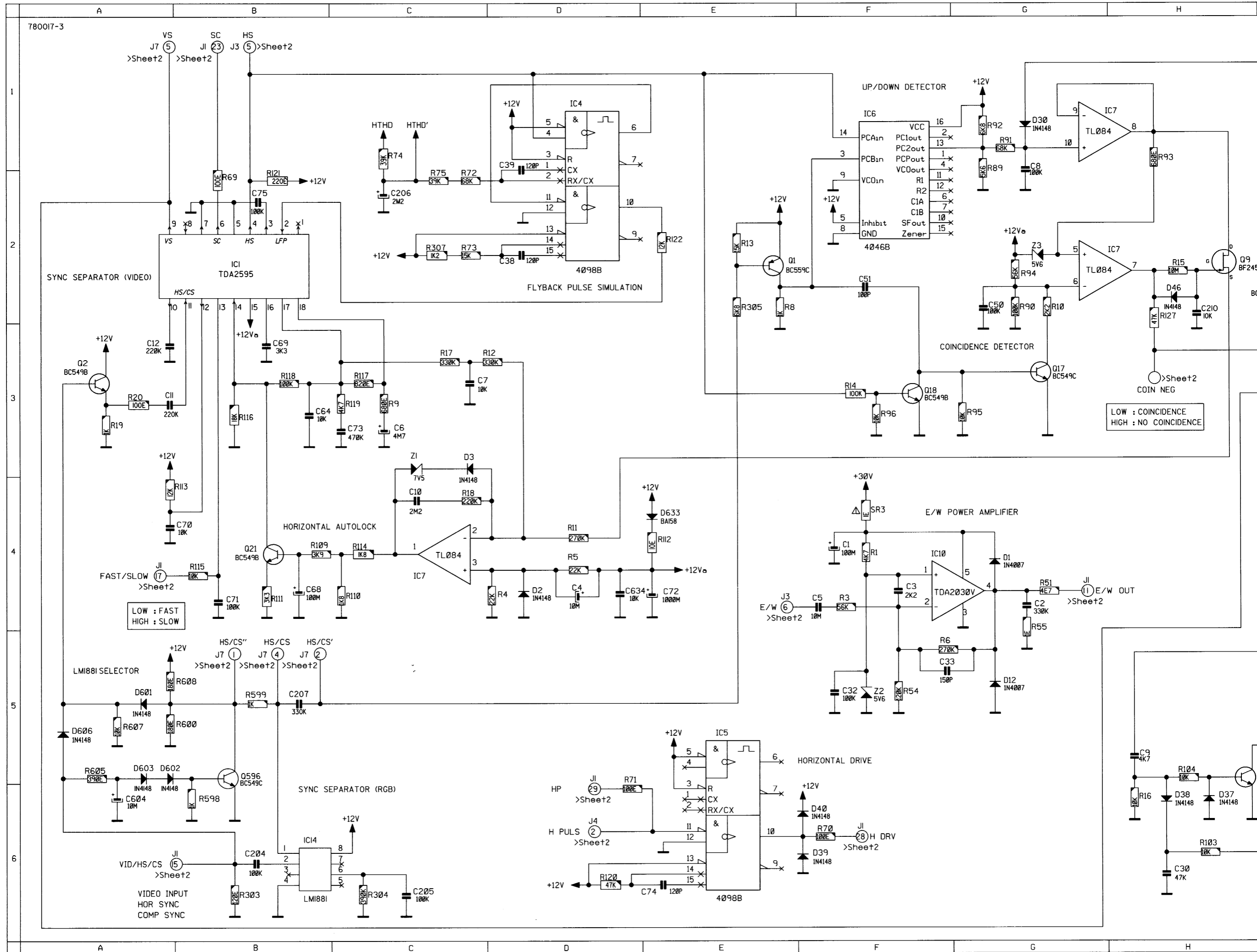
ADJUSTMENT
VERTICAL
LOWEST
OSCILLATOR
FREQUENCY
V HOLD-L

CONNECTION
TO PORT 3
VIA FRAME

BARCO

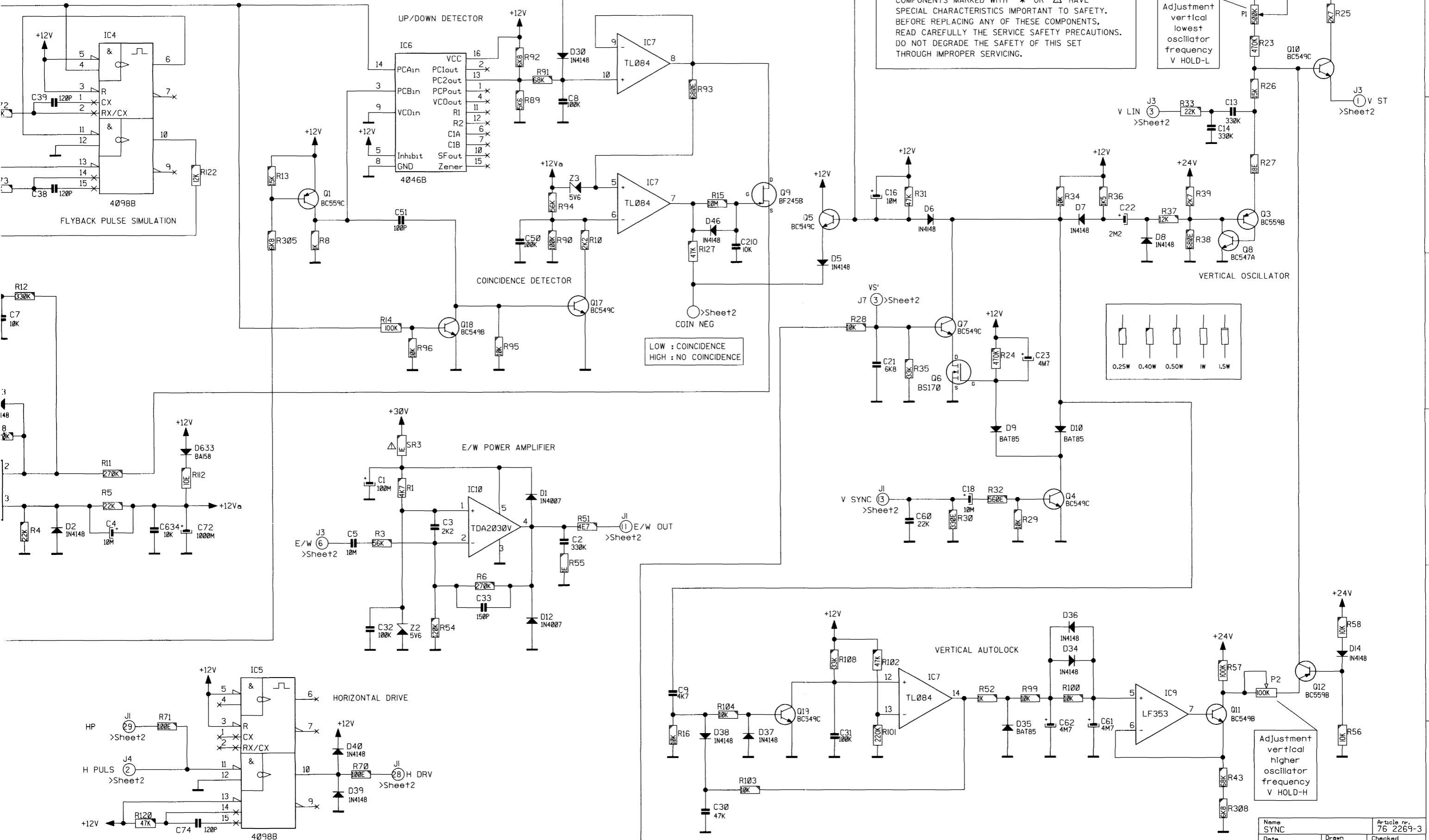


| COMP. LOC. | COMP. LOC. | COMP. LOC. | COMP. LOC. | COMP. LOC. |
|------------|------------|------------|------------|------------|
| C1 C6 | C63 G3 | IC8 C3 | R21 C2 | R77 F3 |
| C1 C2 | C64 F6 | IC8 F4 | R22 C6 | R78 C4 |
| C1 C4 | C65 G6 | IC9 D6 | R22 C2 | R78 F2 |
| C2 C6 | C66 G6 | IC9 D3 | R23 C6 | R79 C4 |
| C2 C4 | C67 F6 | IC9 F3 | R23 B2 | R79 F2 |
| C2 G5 | C68 F6 | IC10 C3 | R23 F4 | R80 C4 |
| C3 D6 | C69 F6 | IC10 G4 | R24 C6 | R80 F2 |
| C3 D4 | C70 F6 | IC11 C2 | R24 C1 | R81 C4 |
| C3 G4 | C71 F6 | IC11 G2 | R24 F5 | R81 F2 |
| C4 C6 | C72 F6 | IC12 C4 | R25 D5 | R82 C4 |
| C4 D4 | C73 F6 | IC12 G2 | R25 F4 | R82 E2 |
| C4 E6 | C74 G5 | IC13 G1 | R26 D5 | R83 D4 |
| C5 C5 | C75 F6 | IC14 G5 | R26 C2 | R83 E2 |
| C5 D4 | C78 G4 | IC26 D6 | R26 F4 | R84 D3 |
| C5 G4 | C79 G4 | IC336 C3 | R27 D5 | R84 F2 |
| C6 D6 | C80 G3 | | R27 C1 | R85 C4 |
| C6 D2 | C81 F3 | J1 B6 | R27 E4 | R85 E1 |
| C6 F6 | C82 F4 | J1 H4 | R28 C6 | R86 C4 |
| C7 D5 | C83 F3 | J2 B6 | R28 B2 | R86 F1 |
| C7 D3 | CI00 G6 | J2 H3 | R28 F5 | R87 B4 |
| C7 E6 | CI01 F3 | J3 B4 | R29 C5 | R87 F1 |
| C8 C5 | C201 F2 | J3 F4 | R29 B3 | R88 C4 |
| C8 D2 | C202 F2 | J4 B3 | R29 F4 | R88 E1 |
| C8 F5 | C203 F2 | J4 F3 | R30 D5 | R89 C4 |
| C9 C6 | C204 G5 | J5 B5 | R30 C1 | R89 F5 |
| C9 D3 | C205 G5 | J5 F2 | R30 F4 | R90 C2 |
| C9 F4 | C206 G4 | J6 B1 | R31 D5 | R90 F5 |
| CI0 D5 | C207 G5 | J6 F2 | R31 C1 | R91 C2 |
| CI0 C1 | C208 F3 | J7 G5 | R31 F4 | R91 F5 |
| CI0 E6 | C210 F5 | | R32 D6 | R92 C2 |
| CI1 D6 | C214 G3 | LI G3 | R32 B2 | R92 F2 |
| CI1 C1 | C219 D3 | L2 G3 | R32 F4 | R93 C2 |
| CI1 F5 | C300 C3 | | R33 C6 | R93 F5 |
| CI2 D6 | C302 C4 | PI C2 | R33 F4 | R94 C3 |
| CI2 C1 | C304 C2 | PI E4 | R34 C6 | R94 F5 |
| CI2 F5 | C368 C2 | P2 C2 | R34 F4 | R95 C3 |
| CI3 D6 | C604 F3 | P2 E3 | R35 C6 | R95 F5 |
| CI3 C1 | C624 E2 | P620 E2 | R35 C3 | R96 C3 |
| CI3 E4 | C625 F2 | P621 E3 | R35 F5 | R96 F5 |
| CI4 C5 | C634 F6 | P626 E2 | R36 B6 | R97 B3 |
| CI4 D5 | | P627 E2 | R36 F4 | R97 F2 |
| CI4 E4 | DI C6 | | R37 C5 | R98 C2 |
| CI5 C6 | DI B2 | Q1 C5 | R37 C3 | R98 F3 |
| CI5 D3 | DI G4 | Q1 C1 | R37 F4 | R99 C2 |
| CI5 F4 | D2 C6 | Q1 F5 | R38 C5 | R99 F5 |
| CI6 C6 | D2 B2 | Q2 C5 | R38 C3 | R100 E4 |
| CI6 D4 | D2 F5 | Q2 B2 | R38 F4 | R101 F5 |
| CI6 F5 | D3 B5 | Q2 G5 | R39 B6 | R102 F5 |
| CI7 C6 | D3 C3 | Q3 C5 | R39 C2 | R103 F5 |
| CI7 D4 | D3 E6 | Q3 B2 | R39 F4 | R104 F4 |
| CI8 D6 | D4 B5 | Q3 E4 | R40 D6 | R105 G3 |
| CI8 D2 | D4 C3 | Q4 B5 | R40 C2 | R106 F3 |
| CI8 F4 | D5 C6 | Q4 D2 | R41 D6 | R107 F3 |
| CI9 C6 | D5 C3 | Q4 F4 | R41 C3 | R108 F5 |
| CI9 B3 | D5 F4 | Q5 B5 | R41 F2 | R109 F6 |
| CI9 F4 | D6 C5 | Q5 F4 | R42 B5 | R110 F6 |
| CI20 C6 | D6 D1 | Q6 C4 | R42 D2 | R111 F6 |
| CI20 D2 | D6 F5 | Q6 F5 | R42 G2 | R112 F6 |
| CI20 F4 | D7 B5 | Q7 C4 | R43 B5 | R113 F6 |
| CI21 B6 | D7 C3 | Q7 F4 | R43 D2 | R114 E6 |
| CI21 D1 | D7 F4 | Q8 B4 | R43 E3 | R115 G5 |
| CI21 G5 | D8 B5 | Q8 E4 | R44 B5 | R116 F6 |
| CI22 D1 | D8 D3 | Q9 F5 | R44 D2 | R117 F6 |
| CI22 F4 | D8 F4 | Q10 D1 | R44 F1 | R118 F6 |
| CI23 D2 | D9 D3 | Q10 F4 | R45 B5 | R119 F6 |
| CI23 F5 | D9 F4 | Q11 D2 | R45 D2 | R120 F5 |
| CI24 B2 | D10 D2 | Q11 F3 | R45 F2 | R121 G6 |
| CI24 G2 | D10 F4 | Q12 F3 | R46 B5 | R122 G6 |
| CI25 C3 | D11 D4 | Q14 F2 | R46 D1 | R123 F4 |
| CI25 G1 | D11 G1 | Q15 F2 | R47 B5 | R127 F5 |
| CI26 C2 | D12 C3 | Q16 F2 | R47 D1 | R201 F2 |
| CI26 G1 | D12 G4 | Q17 F5 | R47 F2 | R202 F2 |
| CI27 C2 | D13 C3 | Q18 F5 | R48 B5 | R203 F1 |
| CI27 G1 | D13 G1 | Q19 E5 | R48 D1 | R212 D3 |
| CI28 C2 | D14 B2 | Q20 F3 | R48 F2 | R213 C4 |
| CI28 F1 | D14 F3 | Q21 F6 | R49 B5 | R217 C3 |
| CI29 B3 | D15 B4 | Q306 B1 | R49 C1 | R218 C3 |
| CI29 F2 | D15 G1 | Q312 B1 | R49 F1 | R222 D2 |
| CI30 C3 | D16 C4 | Q596 F3 | R50 B5 | R301 C4 |
| CI30 E4 | D16 F2 | Q611 F3 | R50 C2 | R301 F2 |
| CI31 B2 | D17 C4 | Q612 F2 | R50 F4 | R302 F2 |
| CI31 E5 | D18 B1 | | R51 C5 | R303 G5 |
| CI32 D1 | D18 F2 | RI D5 | R51 C2 | R304 G5 |
| CI32 G4 | D19 E2 | RI B1 | R51 G5 | R305 G5 |
| CI33 D1 | D20 E2 | RI G4 | R52 C5 | R306 F3 |
| CI33 G5 | D21 G2 | R2 D5 | R52 B3 | R307 B2 |
| CI34 C2 | D22 E2 | R2 C2 | R52 E5 | R307 G6 |
| CI34 F2 | D23 G2 | R3 D5 | R53 B4 | R308 B2 |
| CI35 C3 | D24 E1 | R3 G4 | R53 H4 | R308 E3 |
| CI35 G1 | D25 G2 | R4 D6 | R54 B4 | R309 B2 |
| CI36 D4 | D26 F1 | R4 E5 | R54 G4 | R311 B2 |
| CI36 F2 | D27 F1 | R5 C6 | R55 C2 | R363 D3 |
| CI37 C3 | D28 E2 | R5 F5 | R55 G4 | R364 D3 |
| CI37 F2 | D29 F1 | R6 B6 | R56 F3 | R365 D3 |
| CI38 D3 | D30 F5 | R6 G4 | R57 C3 | R366 D3 |
| CI38 G6 | D31 G2 | R7 D5 | R57 F4 | R367 D3 |
| CI39 C3 | D32 G2 | R8 C6 | R58 C2 | R598 F3 |
| CI39 G6 | D33 G2 | R8 F4 | R58 F3 | R599 G3 |
| CI40 C4 | D34 E4 | R9 C6 | R59 C2 | R600 G4 |
| CI41 C5 | D35 E5 | R9 C3 | R59 G1 | R605 F3 |
| CI41 G2 | D36 E4 | R9 F6 | R60 D4 | R607 G4 |
| CI42 C4 | D37 F4 | R10 C6 | R60 G2 | R608 F3 |
| CI42 F2 | D38 F4 | R10 C3 | R61 C2 | R609 F3 |
| CI43 C4 | D39 G6 | R10 F5 | R61 G3 | R610 E3 |
| CI43 F2 | D40 G5 | R11 D6 | R62 C3 | R613 E3 |
| CI44 C4 | D41 G3 | R11 D3 | R62 F3 | R614 E3 |
| CI44 F1 | D46 F5 | R11 F5 | R63 D4 | R615 E2 |
| CI45 C4 | D377 D5 | R12 D6 | R63 G3 | R616 E2 |
| CI45 D1 | D601 G4 | R12 D3 | R64 D4 | R617 E3 |
| CI46 C4 | D602 F3 | R12 E6 | R64 F2 | R618 E3 |
| CI46 F2 | D603 F3 | R13 D6 | R65 D3 | R619 E3 |
| CI47 D4 | D606 G4 | R13 D4 | R65 F2 | R622 F2 |
| CI47 F1 | D633 G6 | R13 F5 | R66 F2 | R623 F2 |
| CI48 C4 | | R14 B5 | R67 D4 | R628 F2 |
| CI48 F3 | ICI D6 | R14 D4 | R67 F2 | R629 F2 |
| CI49 C4 | ICI D2 | R14 F5 | R68 D4 | |
| CI49 F2 | ICI F6 | R15 B5 | R68 F2 | SRI G3 |
| CI50 B3 | IC2 C6 | R15 F5 | R69 C2 | SR2 G3 |
| CI50 F6 | IC2 D3 | R16 B5 | R69 F6 | SR3 G4 |
| CI51 C3 | IC2 G6 | R16 D2 | R70 C2 | |
| CI51 F5 | IC3 C6 | R16 E4 | R70 G6 | Z1 E6 |
| CI52 C2 | IC3 D3 | R17 C5 | R71 C1 | Z2 G4 |
| CI52 G2 | IC3 G4 | R17 D2 | R71 G5 | Z3 F5 |
| CI53 C3 | IC4 C5 | R17 F6 | R72 B3 | |
| CI53 F3 | IC4 D4 | R18 C5 | R72 G6 | |
| CI54 G2 | IC4 F6 | R18 D2 | R73 B3 | |
| CI55 G2 | IC5 C5 | R18 E5 | R73 G6 | |
| CI56 G2 | IC5 D4 | R19 C5 | R74 C4 | |
| CI57 G2 | IC5 F6 | R19 D4 | R74 H4 | |
| CI58 G2 | IC6 C6 | R19 G5 | R75 C4 | |
| CI59 F2 | IC6 D4 | R20 C5 | R75 G5 | |
| CI60 F4 | IC6 F5 | R20 C3 | R76 C4 | |
| CI61 F4 | IC7 C1 | R20 G5 | R76 F3 | |
| CI62 E4 | IC7 E5 | R21 C6 | R77 C4 | |



PRODUCT SAFETY NOTICE

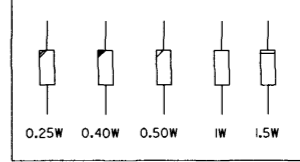
COMPONENTS MARKED WITH * OR Δ HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE SERVICE SAFETY PRECAUTIONS. DO NOT DEGRADE THE SAFETY OF THIS SET THROUGH IMPROPER SERVICING.



Adjustment
vertical
lowest
oscillator
frequency
V HOLD-L

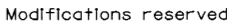
V LIN
>Sheet2

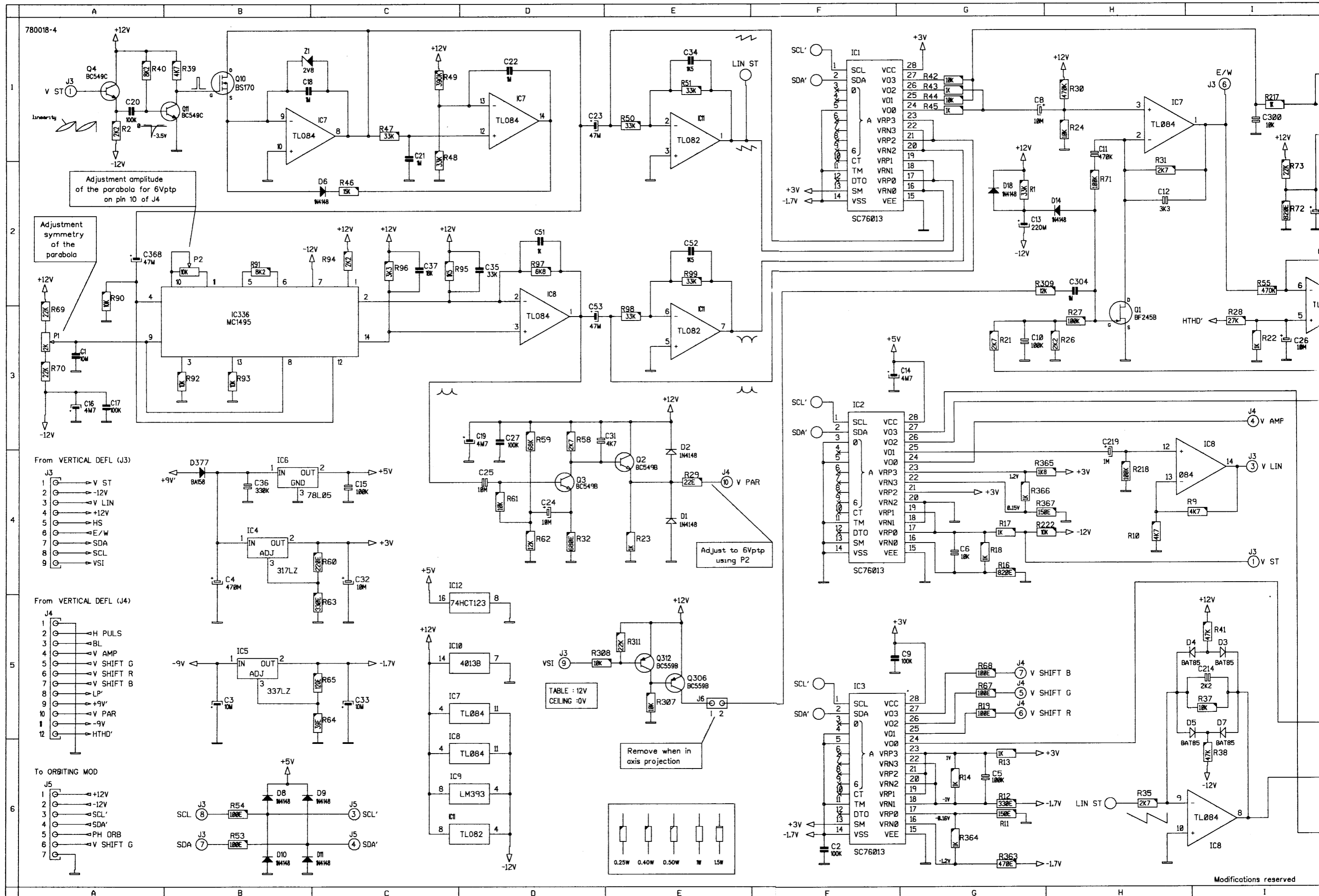
VERTICAL OSCILLATOR

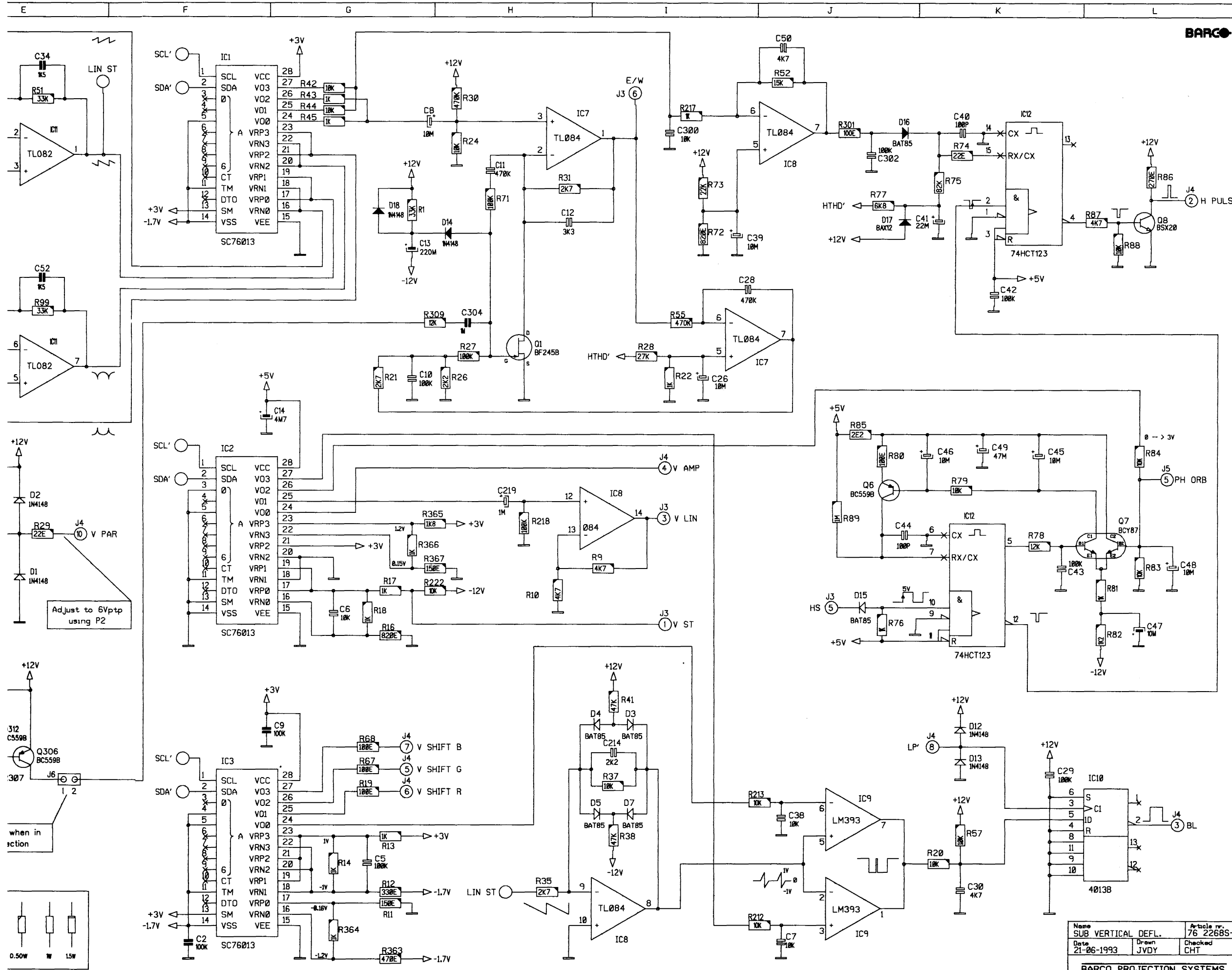


Adjustment
vertical
higher
oscillator
frequency
V HOLD-H

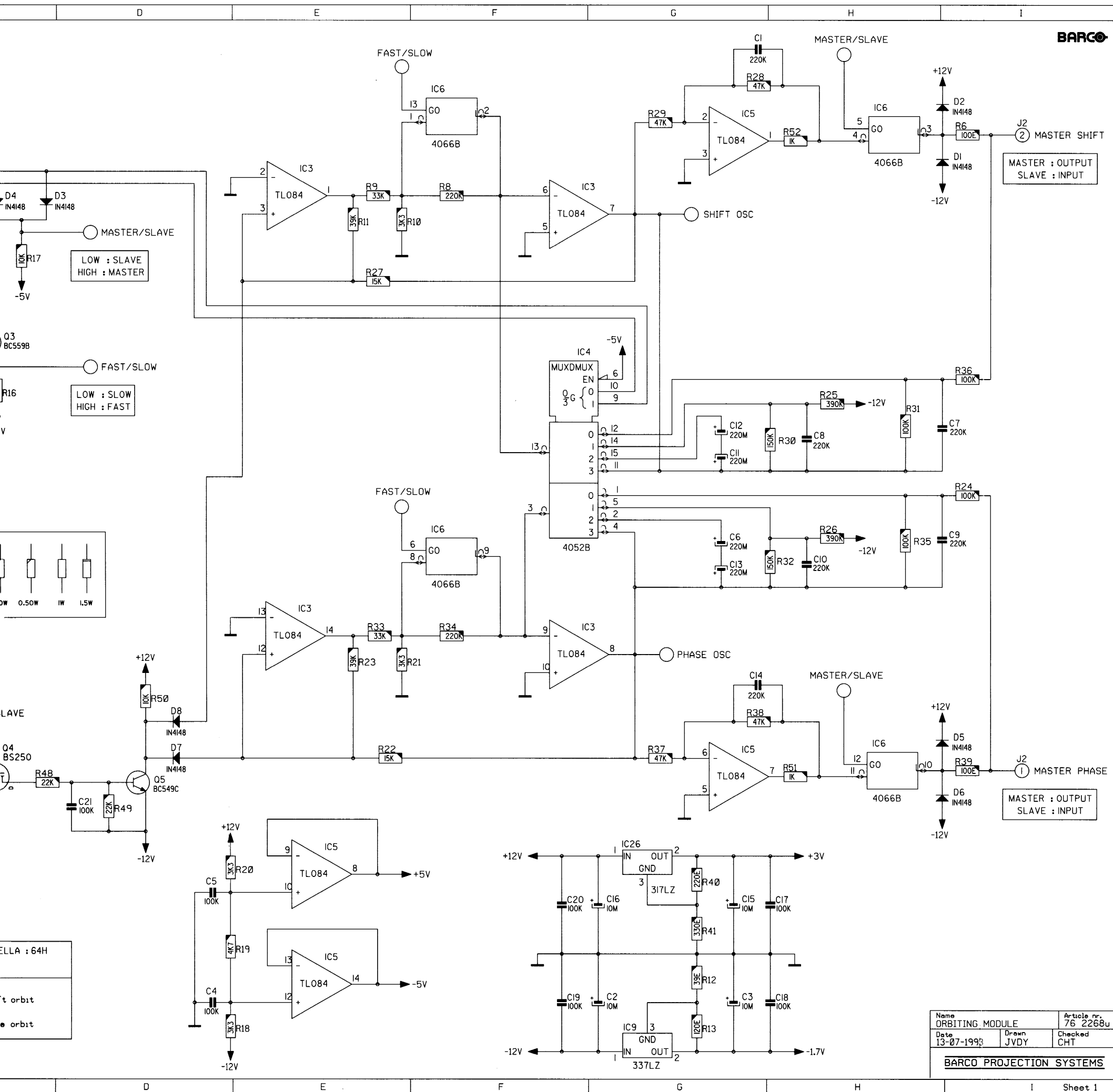
| | |
|--------------------------|--------------------------|
| Name SYNC | Article nr. 76 2269-3 |
| Date 23-11-1993 | Drawn JVDY |
| | Checked CHT |
| BARCO PROJECTION SYSTEMS | |







| COMP. LOC. | | COMP. LOC. | | COMP. LOC. | |
|------------|-----|------------|-----|------------|-----|
| C1 | A 3 | J3 | A 4 | R309 | G 2 |
| C2 | F 6 | J4 | A 5 | R311 | E 5 |
| C3 | B 5 | J5 | A 6 | R363 | G 6 |
| C4 | B 4 | J6 | E 5 | R364 | G 6 |
| C5 | G 6 | | | R365 | G 4 |
| C6 | G 4 | P1 | A 3 | R366 | G 4 |
| C7 | J 6 | P2 | B 2 | R367 | G 4 |
| C8 | G 1 | | | | |
| C9 | G 5 | Q1 | H 3 | Z1 | B 1 |
| C10 | G 3 | Q2 | E 4 | | |
| C11 | H 1 | Q3 | D 4 | | |
| C12 | H 2 | Q4 | A 1 | | |
| C13 | G 3 | Q5 | J 3 | | |
| C14 | C 4 | Q6 | L 2 | | |
| C15 | A 3 | Q7 | L 4 | | |
| C16 | A 3 | Q8 | B 1 | | |
| C17 | D 3 | Q9 | B 1 | | |
| C18 | B 1 | Q10 | E 5 | | |
| C19 | D 3 | Q11 | E 5 | | |
| C20 | A 1 | Q12 | E 5 | | |
| C21 | C 1 | R1 | G 2 | | |
| C22 | D 1 | R2 | A 1 | | |
| C23 | D 1 | R9 | H 4 | | |
| C24 | D 4 | R10 | H 4 | | |
| C25 | D 4 | R11 | G 6 | | |
| C26 | I 3 | R12 | G 6 | | |
| C27 | D 3 | R13 | G 6 | | |
| C28 | I 2 | R14 | G 6 | | |
| C29 | K 5 | R15 | G 4 | | |
| C30 | K 6 | R16 | G 4 | | |
| C31 | E 3 | R17 | G 4 | | |
| C32 | C 4 | R18 | G 4 | | |
| C33 | C 5 | R19 | G 5 | | |
| C34 | E 1 | R20 | K 6 | | |
| C35 | D 2 | R21 | G 3 | | |
| C36 | B 4 | R22 | I 3 | | |
| C37 | C 2 | R23 | E 4 | | |
| C38 | J 5 | R24 | H 1 | | |
| C39 | I 2 | R25 | H 3 | | |
| C40 | K 1 | R26 | H 3 | | |
| C41 | J 2 | R27 | I 3 | | |
| C42 | K 2 | R28 | E 4 | | |
| C43 | K 4 | R29 | H 1 | | |
| C44 | J 4 | R30 | H 1 | | |
| C45 | K 3 | R31 | H 1 | | |
| C46 | K 3 | R32 | D 4 | | |
| C47 | L 4 | R33 | H 6 | | |
| C48 | K 3 | R34 | I 5 | | |
| C49 | K 3 | R35 | B 1 | | |
| C50 | J 1 | R36 | A 1 | | |
| C51 | D 2 | R37 | I 5 | | |
| C52 | E 2 | R38 | I 6 | | |
| C53 | D 2 | R39 | B 1 | | |
| C54 | I 5 | R40 | A 1 | | |
| C55 | H 3 | R41 | I 5 | | |
| C56 | I 1 | R42 | G 1 | | |
| C57 | H 2 | R43 | G 1 | | |
| C58 | A 2 | R44 | G 1 | | |
| C59 | | R45 | G 1 | | |
| C60 | | R46 | C 2 | | |
| C61 | | R47 | C 1 | | |
| C62 | | R48 | C 1 | | |
| C63 | | R49 | C 1 | | |
| C64 | | R50 | E 1 | | |
| C65 | | R51 | E 1 | | |
| C66 | | R52 | J 1 | | |
| C67 | | R53 | B 6 | | |
| C68 | | R54 | B 6 | | |
| C69 | | R55 | I 2 | | |
| C70 | | R56 | K 6 | | |
| C71 | | R57 | D 3 | | |
| C72 | | R58 | D 3 | | |
| C73 | | R59 | D 3 | | |
| C74 | | R60 | C 4 | | |
| C75 | | R61 | D 4 | | |
| C76 | | R62 | D 4 | | |
| C77 | | R63 | C 5 | | |
| C78 | | R64 | C 5 | | |
| C79 | | R65 | C 5 | | |
| C80 | | R66 | G 5 | | |
| C81 | | R67 | A 3 | | |
| C82 | | R68 | A 3 | | |
| C83 | | R69 | H 2 | | |
| C84 | | R70 | H 2 | | |
| C85 | | R71 | I 2 | | |
| C86 | | R72 | I 2 | | |
| C87 | | R73 | I 2 | | |
| C88 | | R74 | K 1 | | |
| C89 | | R75 | K 1 | | |
| C90 | | R76 | J 2 | | |
| C91 | | R77 | K 4 | | |
| C92 | | R78 | K 3 | | |
| C93 | | R79 | J 3 | | |
| C94 | | R80 | L 4 | | |
| C95 | | R81 | L 4 | | |
| C96 | | R82 | L 4 | | |
| C97 | | R83 | L 3 | | |
| C98 | | R84 | J 3 | | |
| C99 | | R85 | J 3 | | |
| C100 | | R86 | L 1 | | |
| C101 | | R87 | L 2 | | |
| C102 | | R88 | L 2 | | |
| C103 | | R89 | J 4 | | |
| C104 | | R90 | A 2 | | |
| C105 | | R91 | B 2 | | |
| C106 | | R92 | B 3 | | |
| C107 | | R93 | B 3 | | |
| C108 | | R94 | C 2 | | |
| C109 | | R95 | C 2 | | |
| C110 | | R96 | C 2 | | |
| C111 | | R97 | D 2 | | |
| C112 | | R98 | E 3 | | |
| C113 | | R99 | E 2 | | |
| C114 | | R100 | I 6 | | |
| C115 | | R101 | I 5 | | |
| C116 | | R102 | I 5 | | |
| C117 | | R103 | H 4 | | |
| C118 | | R104 | G 4 | | |
| C119 | | R105 | G 4 | | |
| C120 | | R106 | J 1 | | |
| C121 | | R107 | E 5 | | |
| C122 | | R108 | E 5 | | |
| C123 | | R109 | D 5 | | |
| C124 | | R110 | D 5 | | |
| C125 | | R111 | D 5 | | |
| C126 | | R112 | D 5 | | |
| C127 | | R113 | D 5 | | |
| C128 | | R114 | D 5 | | |
| C129 | | R115 | D 5 | | |
| C130 | | R116 | D 5 | | |
| C131 | | R117 | D 5 | | |
| C132 | | R118 | D 5 | | |
| C133 | | R119 | D 5 | | |
| C134 | | R120 | D 5 | | |
| C135 | | R121 | D 5 | | |
| C136 | | R122 | D 5 | | |



| COMP. LOC. | | COMP. LOC. | |
|------------|-----|------------|-----|
| C1 | G 1 | R48 | C 5 |
| C2 | G 6 | R49 | D 5 |
| C3 | G 6 | R50 | D 4 |
| C4 | D 6 | R51 | H 5 |
| C5 | D 5 | R52 | H 1 |
| C6 | G 3 | | |
| C7 | I 3 | | |
| C8 | H 3 | | |
| C9 | I 3 | | |
| C10 | H 4 | | |
| C11 | G 3 | | |
| C12 | G 3 | | |
| C13 | G 4 | | |
| C14 | G 4 | | |
| C15 | G 5 | | |
| C16 | G 5 | | |
| C17 | H 5 | | |
| C18 | H 6 | | |
| C19 | F 6 | | |
| C20 | F 5 | | |
| C21 | D 5 | | |
| D1 | I 1 | | |
| D2 | I 1 | | |
| D3 | D 1 | | |
| D4 | C 1 | | |
| D5 | I 5 | | |
| D6 | I 5 | | |
| D7 | D 5 | | |
| D8 | D 4 | | |
| IC1 | A 2 | | |
| IC2 | A 1 | | |
| IC3 | F 4 | | |
| IC3 | F 1 | | |
| IC3 | E 1 | | |
| IC3 | E 4 | | |
| IC3 | A 5 | | |
| IC3 | A 5 | | |
| IC4 | F 2 | | |
| IC4 | A 6 | | |
| IC4 | A 6 | | |
| IC5 | G 1 | | |
| IC5 | G 5 | | |
| IC5 | E 5 | | |
| IC5 | E 6 | | |
| IC5 | A 5 | | |
| IC5 | A 5 | | |
| IC6 | F 3 | | |
| IC6 | H 1 | | |
| IC6 | H 5 | | |
| IC6 | F 1 | | |
| IC6 | A 5 | | |
| IC6 | A 5 | | |
| IC9 | G 6 | | |
| IC26 | G 5 | | |
| J1 | A 4 | | |
| J2 | B 4 | | |
| Q1 | C 1 | | |
| Q2 | C 1 | | |
| Q3 | C 2 | | |
| Q4 | C 5 | | |
| Q5 | D 5 | | |
| R1 | B 3 | | |
| R2 | B 3 | | |
| R3 | B 3 | | |
| R4 | B 3 | | |
| R5 | B 3 | | |
| R6 | I 1 | | |
| R7 | B 3 | | |
| R8 | F 1 | | |
| R9 | F 1 | | |
| R10 | E 2 | | |
| R11 | E 2 | | |
| R12 | G 6 | | |
| R13 | G 2 | | |
| R14 | C 2 | | |
| R15 | C 2 | | |
| R16 | C 3 | | |
| R17 | C 2 | | |
| R18 | E 6 | | |
| R19 | E 6 | | |
| R20 | E 5 | | |
| R21 | E 4 | | |
| R22 | E 5 | | |
| R23 | E 4 | | |
| R24 | I 3 | | |
| R25 | H 3 | | |
| R26 | H 3 | | |
| R27 | E 2 | | |
| R28 | G 1 | | |
| R29 | G 1 | | |
| R30 | H 3 | | |
| R31 | H 3 | | |
| R32 | H 4 | | |
| R33 | E 4 | | |
| R34 | F 4 | | |
| R35 | H 3 | | |
| R36 | I 2 | | |
| R37 | G 5 | | |
| R38 | G 4 | | |
| R39 | I 5 | | |
| R40 | G 5 | | |
| R41 | G 6 | | |
| R42 | B 1 | | |
| R43 | B 1 | | |
| R44 | B 1 | | |
| R45 | C 1 | | |
| R46 | C 2 | | |
| R47 | B 1 | | |

| | | | |
|--------------------------|---------------|-------------------------|--|
| Name ORBITING MODULE | | Article nr. 76 2268u | |
| Date 13-07-1993 | Drawn JVDY | Checked CHT | |
| BARCO PROJECTION SYSTEMS | | | |

Adjustment procedure 'VERTICAL DEFLECTION+SYNC MODULE'

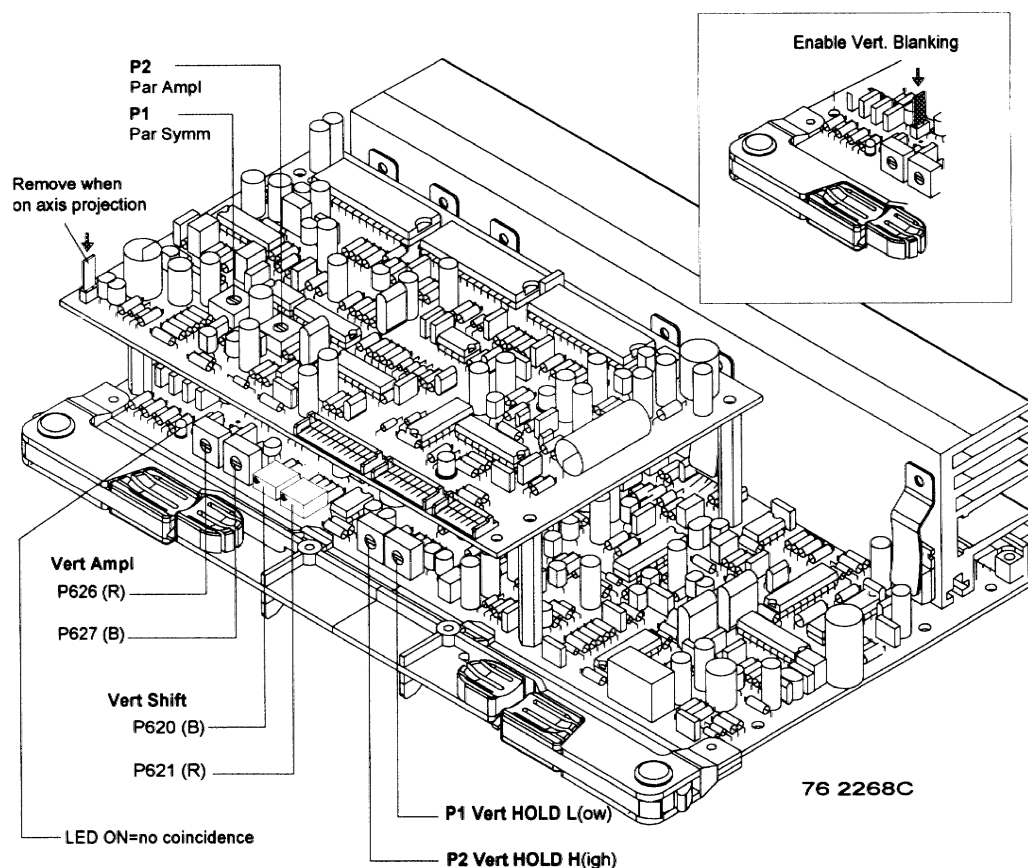
Introduction

The following adjustments are provided on the **main module**:

- a. Vertical HOLD L P1 and Vertical HOLD H P2
- b. Vertical SHIFT adjustment for RED - P621 and BLUE - P620 image
- C. Vertical amplitude correction for RED - P626 and BLUE - P627 image

The following adjustments are provided on the **sub module**:

- a. Vertical parabola symmetry P1
- b. Vertical parabola amplitude P2



Adjustments on the main module

a. Main Vertical SHIFT adjustment for RED and BLUE image

Note: These are factory set coarse alignments of vertical shift, to compensate for the shift caused by the stigmators on the CRT necks. These potentiometers also are used to minimize the range of the BELLA potentiometers for the vertical shift, allowing for a more accurate center convergence.

Preparation

Adjust the vertical raster centering controls for Red and Blue in their mid position. The numeric indicator under the respective bar scale indicates 50. (Refer to the Owner's manual of the projector - Guided or Random adjustment mode).

Alignment

Use the vertical shift controls P621 for RED and P620 for BLUE to shift vertically the Red and Blue image until the horizontal center line coincides with this of the Green image.

b. Vertical amplitude correction for RED and BLUE image

Adjust potentiometer P626 for the Red image and P627 for the Blue image to obtain the same vertical amplitude as the Green image.

c. Vertical Hold I P1 - Hold II P2

Adjustment on the **lowest Vert. Frequency 37 Hz - P1**

- Projector has to operate on a signal with 37 Hz frame frequency
- Turn the potentiometer P2 in its mid-position
- Adjust P1 for synchronisation of the picture

Adjustment on the **highest Vert. Frequency 120 Hz - P402**

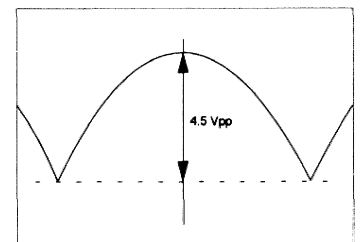
- Projector has to operate on a signal with 120 Hz frame frequency
- Adjust P2 for synchronisation of the picture

Adjustments on the sub module

Vertical parabola symmetry P1 and amplitude P2

Adjustment **Symmetry** of the vertical parabola **P1**

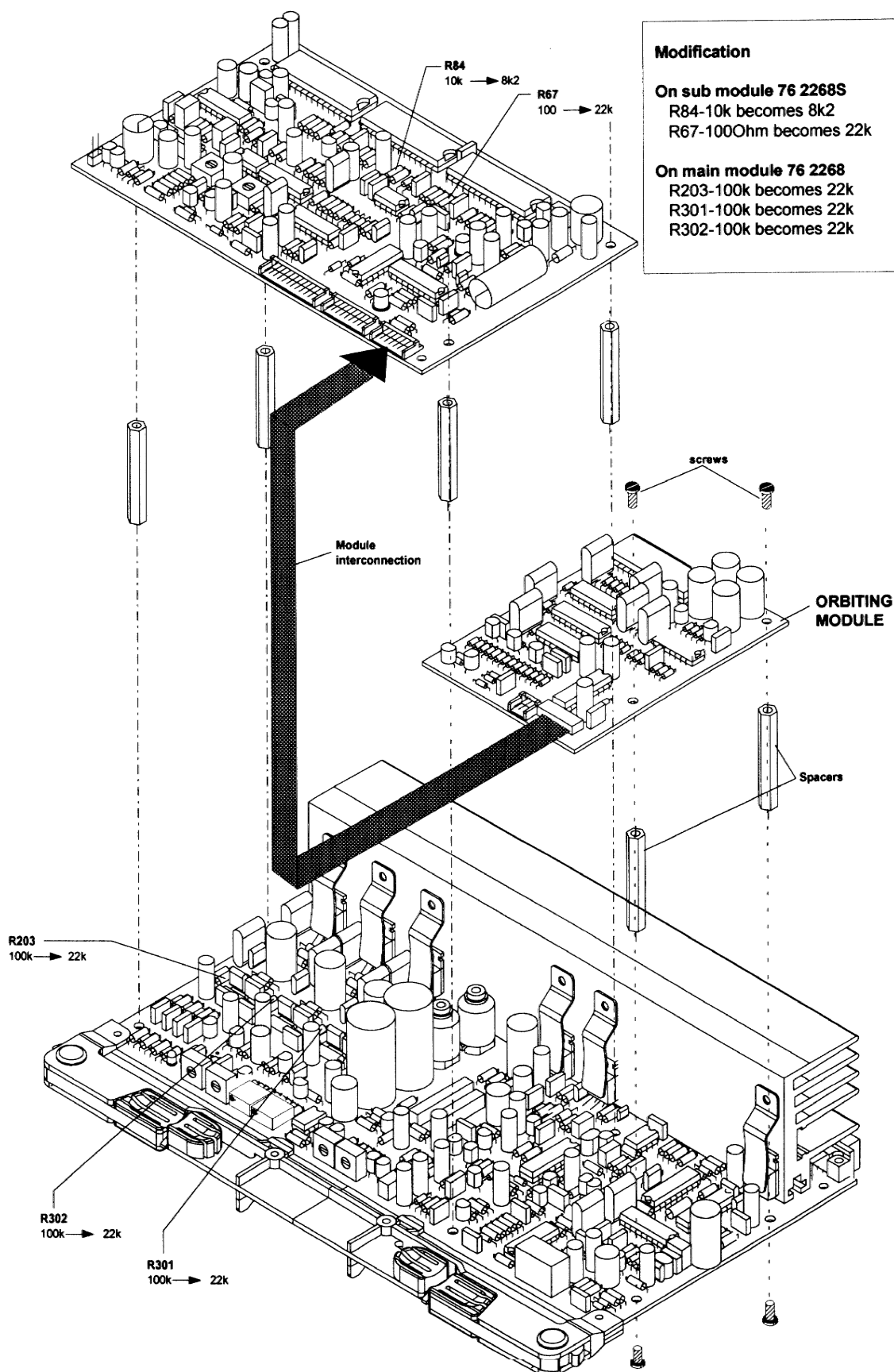
- Projector has to operate on a signal with standard frequency.
- Connect the oscilloscope to the resistor R29.
- Adjust P1 for a symmetrical curve of the parabola signal.



Adjustment **Amplitude** of the vertical parabola **P2**

- Projector has to operate on a signal with standard frequency.
- Connect the oscilloscope to the resistor R29.
- Adjust P2 for an amplitude of the parabola signal of 4.5 Vpp

Mounting the ORBITING module 76 2268u



TECHNICAL DESCRIPTION "UN SYNC + VERT DEFL" 762268.

Introduction.

On this board and its subunit we find

- the sync separators
- the autolock circuits for driving the line and vertical oscillators
- the vertical power output stages
- the top / bottom blanking
- the preparation of the waveforms for the east-west correction.
- preparation of the horizontal drive pulses, including the phase and skew / bow.

A (Barco) customer-made IC, comprising four (4) digital potentiometers, driven by an I²C bus is used to adjust waveforms and DC voltages.

I. The Vertical oscillator

a) Sawtooth oscillator (free running) :

The vertical sawtooth relaxation oscillator is built up around Q3 and Q8. The +30 volts from the Switched Mode Power Supply board is stabilized at 24 volts by IC8 and charges up the capacitors C13 and C14 through P1 (Vert Hold for the lowest frequency) , R23 and R26.

As soon the emitter of Q3 reaches the voltage set by R38 / R39 (the transistor Q3 starts conducting. As its collector current flows into the base of Q8 , the latter saturates very quickly, discharging the capacitors C13 / C14.

Q3 and Q8 stop conducting and the cycle can start again.

b) Synchronisation of the vertical oscillator.

1) By means of the composite sync :

The composite video (VID) composite sync (CS) or Hor Sync (HS) is, at any time, applied to pin 2 of IC14, a typical sync separator. The output pin 1 serves the digital PLL IC6.

If D606 is in conduction (depends on the DC level of the input signal) the video composite also passes to the base of Q2, a buffer serving the TDA2595. In this case D601 is blocked.

The TDA2595 is used as sync separator for video composite since its input is noise - integrating. In that case the transistor Q596 is saturated and D601 is blocked.

If the sync input is HS or CS, then , the LM1881 is used as sync separator since it has no integrator at the input.

The composite sync output HS / CS, pin 1, is proceeding to IC1 via a buffer Q2 on the condition that Q596 is not saturating.

The output pin 9 of IC1 is providing vertical pulses which are now sent to the base of Q7. If we assume that the switcher Q6 is conducting (see later), the negative pulses on the collector of Q7 can trigger the vertical oscillator.

The oscillator can also be triggered by means of the vertical pulses **V Sync**, which come straight from an BNC input (via the differential input, at the base of Q4.

Note that an optional HDTV interface with tri-level sync may be connected to the J7 connector.

2) By means of the vertical pulses VSync, if applied separately.

These vertical pulses enter the board at contact 13 of the J4A connector and are capacitively coupled to the base of Q4.

The amplified negative pulses on the collector trigger the oscillator now via D10 / D7.

To prevent triggering via Q7, the fet Q6 is now blocked as follows:

Each time a VS pulse arrives on the base of Q4, capacitor C23 is charged via D9 / Q4. Consequently, the gate of Q6 is low and Q6 is blocked, to disconnect the emitter of Q7.

c) Barco made IC : 4 x digital controlled potentiometer.

The voltage or waveform, applied between **VRPx** and **VRNx**, the two extremities of a potentiometer, is adjustable in 128 steps through the remote control (I2C bus). The output, or, the 'slider' voltage is available at **VOx**. The corresponding pins are eg. VRP1, VRN1 and VO1.

We find **4** of such potentiometers **in one chip**, and there are three of these chips on the subunit : IC1, IC2 and IC3 , which we will meet in the explanations hereafter.

The output waveform or voltage is controlled by the **SCL** (Serial Clock) and **SDA** (Serial Data) lines which are connected to the microprocessor of the controller board.

The address info, arriving via the data SDA line, is identified by a hardware connection of the address pins of the chip (the address pins are differently connected for each chip).

Obviously, as there are 4 potentiometers, the address of the chip is followed by a '*slave- address*' to drive the requested potentiometer in the chip itself.

d) Vertical Linearity control.

The shape of the sawtooth can be adapted (compressed at the end or at the start) by means of a feedback of an adjustable sawtooth to the capacitor C14 via R33. This sawtooth comes from the digital potentiometer VRP1/VRN1/VO1 in IC2 on the subunit.

Indeed, the sawtooth at the emitter of Q10 leaves the board and arrives on the subunit at contact J3(4), where it is applied, amongst others, to pin 19 of IC2 (VRP1).

The adjusted output, pin 25 (or VO1) is now sent to a bufferstage in IC8 and leaves the subunit at contact J3(3) to arrive again at the motherboard . The returned sawtooth influences the charging behaviour of C14, as it is integrated by R33 / C14, acting consequently as a linearity control.

e) The vertical autolock circuit.

This circuit is built up around Q19 / OP AMP in TL084 (IC7) / 353 (IC9), Q11 and Q12.

The vertical sync pulses are taken at the collector of Q7 and differentiated by C9 / R16.

This differentiation produces a negative, followed by a positive pulse and it is this positive pulse that triggers the transistor Q19.

The output of the OP AMP, behaving as a voltage comparator, is fed back to the base of the transistor in order to prevent it from retriggering as long this output is low .

However, the negative transition of this output voltage is slightly delayed by C30 not to disturb the trigger pulse.

The non-inverting input is pulled up to the +12 Volts line by R108 and a capacitor C31 is connected to ground.

When no trigger pulses are applied to the base of Q19, pin 12 is at +12 volts and obviously the output is equally at 12 volts.

Whenever a trigger pulse (vertical pulse) is applied on the base, the capacitor C31 is discharged via Q19, and the output pin 14 switches to the -12 volts.

As pin 12 is pulled up to the +12 volts, the capacitor C31 charges up again to the +12 volts and from the moment the voltage equals the voltage of the inverting input, the output switches high again.

D38 gets blocked and the base of Q19 is free for a next trigger pulse.

When the next trigger occurs (next vertical pulse), the cycle starts all over again.

The time between two consecutive pulses, being the vertical period, determines the time the output is high as the time the output is low is invariable and determined by the time constant C31/R108 and the voltage set at pin 13.

The duty cycle of this squared waveform is thus proportional with the vertical period.

This squared waveform is now clamped at ground by D35 as only to allow the positive part to charge the capacitors C62/ C61(= integration).

D34 and D36 provide a rapid change in ' both directions' of the voltage across these capacitors.

The resulting voltage at the input of the buffer IC9 (353) is proportional with the vertical period, and consequently a measure of the vertical frequency (= frequency to voltage conversion).

When the vertical frequency increases, the voltage on C61 decreases, which results in a less conducting Q11 and obviously a decrease of the **charging current** of Q12 (voltage to current conversion).

The **Vert HOLD- H** (P2) allows an adjustment of the gain and thus of the highest frequency that can be locked by this system .

f) Vertical output stages - Vertical shift - Vertical amplitude.

Vertical amplitude :

The vertical sawtooth at the emitter of Q10 is leaving the mainboard and reaches the subunit to be applied to IC2 (VRN0 and VRP0). The output is VO0 (pin 24) and is coming back to the board at J4 (4) of the edge connector.

It is now capacitively coupled to the inverting inputs of the power amplifiers IC11 / IC12 / IC13 together with a DC-voltage (Vertical Shift voltage).

The amplitudes for the red and blue can be adjusted by P3 and P4 to allow a matching with the green and to minimize the convergence corrections.

Vertical shifts :

These DC voltages are adjusted in IC3 of the subunit (outputs 25, 26, 27).

The big tolerances on the deflection units and the stigmators require a coarse alignment of the shift for red and blue in order to improve the resolution of the digital potentiometers.

This pre-alignment or coarse alignment is done by the multiturn potentiometers P620 and P621. The voltages applied to the extremities of these potentiometers are inversed when moving the vertical scan inversion switch (switching from ceiling to table or vice versa).

An " **V S I** " info is therefore sent to the switching transistors Q611 / Q612.

This " **V S I** " is at ground level or not at ground (= 'open'). It is a info coming from the contact of the vertical scan inversion switch on the frame.

One of the two transistors is in conduction, depending on the voltage at Q611's base.

When the green raster is moving on the screen, the red and blue rasters move also allowing a quick adjustment of the three colors.

Vertical output stages :

The amplified sawtoothed output currents flow in the respective scan coils and find their way back to ground through the feedback resistors R44 / R97 / R79.

The amplitude of the waveforms across these resistors is proportional with the vertical amplitude and can obviously be utilized as feedback to stabilize the vertical amplitude.

The TDA8172 allows a short vertical retrace time by boosting the supply voltage during the retrace time.

At the end of the scan time, the voltage across the capacitors C35, C55 and C52 is switched in series with the supply voltage of +8 volts by means of a transistor in the chip .

As a result, the voltage during flyback is approximately
 $8 + (8+17) = 33 \text{ volts.}$

This boosting up means a possible **rapid change** of the current in the coils in order to realize a short flyback time.

g) Vertical scan fail detection.

The flyback pulses at the pins 6 of the output amplifiers are all three AC coupled to a parallel detector. The diodes are conducting when the pulses arrive and clamp the top of the pulses at about ground level. The voltages on the capacitors C44 / C45 / C46 is then negative.

The diodes D22 / D24 / D28 are consequently in the blocked state and Q14 is off, as its base is at ground level with R82.

As soon one of the output stages fails (= no flyback pulses anymore), the voltage on the corresponding capacitor increases and via the diode the base of Q14 gets enough voltage and switches on.

Its collector drops to ground level and contact 28 of the J4B edge connector is also at ground level (**Scan Fail is active low**).

On the other hand, the diode D16 and the saturated Q14 **cause a permanent conduction of the Q15** transistor (via D16).

The **V BL** (Vertical Blanking) output is obviously permanently high and this means also a permanent blanking or **cut-off of the three crt's**.

h) Vertical blanking during retrace :

Vertical blanking pulses are picked up at pin 6 of the red output stage and are applied through C63, D41 and R306 at the base of Q20. D41 prevents the BL pulses to penetrate into the vertical output stages.

On the same base arrive the pulses BL for the top and bottom blanking. These pulses are adjusted on the subunit (see further top / bottom blanking).

Tr Q20 drives Q15 and the **V BL** pulses leave at A,C(26) of the J4B edge connector to the decoder, where they are mixed up with the horizontal blanking pulses.

A differentiated vertical sawtooth is added to the base of Q15 in order to blank from the start of the flyback. Indeed, the flyback pulse from the output stage is slightly delayed.

II. East - West correction

a) Generation of a frequency independent vertical sawtooth :

This generator is built up around Q4 / Q11 / Q10 / IC7. The vertical sawtooth "V ST" is buffered and then differentiated to get pulses driving on and off the switching Fet Q10.

When this Fet is on, the output is shorted to the input. This input is approximately ground level since the other input of the OPAMP, pin 10, is connected to ground. The time that Q10 is not in conduction, C18 is charged up from the output voltage at pin 8 via D6 / R46 towards the negative voltage at pin 14 of IC7. The charging current depends obviously upon this negative voltage and the latter is the averaged sawtooth obtained by integration.

By doing this, a constant sawtooth amplitude of 1.9Vpp is got at pin 8. The sawtooth starts from 0 volts due to the clamping transistor Q10.

b) Trapezoidal distortion correction (on the subunit) :

The sawtoothed waveform at pin 8 of IC7, is applied to the inverting pin 2 of IC7 in order to obtain two opposite phase sawtoothed waveforms.

These two signals are now entered into a digital potentiometer in IC1 (pins 16 / 17 or VRN0 and VRP0). The corresponding output is VO0 and via R45 the adjusted sawtooth (in amplitude and phase) reaches the adder- amplifier TL084, pin 5.

c) Parabolic or pincushion distortion correction :

To generate the parabolic waveform, a multiplier is used.

The MC1495 is a wideband monolithic four-quadrant multiplier. The output is a linear product of the two input voltages.

In this case the two input signals are the same (a sawtooth voltage).

One of the sawtooths is applied between pins 4 and 8, whereas the second (and same sawtooth) one is applied between pins 9 and 12.

But, since the pins 4 and 12 are connected together and pins 9 and 8 are also tied together, the output is a parabolic shaped waveform(= product of two linear ramps).

The open collector outputs are pulled up to the + supply line and sent to an OPAMP in IC8

The parabolic signal is then capacitively coupled to an inverter - OPAMP. The two opposite phased signals are then sent to a digital potentiometer in IC1 for the pincushion correction.

The output VO2 is now mixed up with the previously discussed sawtooth output and passing the line frequency depending amplifier described hereafter.

c) Frequency depending correction :

The gain of the OP AMP in IC7 is variable and depends on the divider R31 / Q1. The Fet Q1 is biased by the output of another OP AMP (integrator-comparator) in IC7 (pin 1).

The DC level of the non-inverting input, pin 3, is set by R30 / R24. This DC voltage now is amplified by a factor determined by the ratio R31 / Q1. The east - west waveform obviously 'undergoes' the same gain.

The output now (sum of DC and east-west waveforms) is sent to a 'comparator' in IC7. But the east - west waveform is filtered out by the R55 / C28 network. This resulting amplified dc voltage is compared to a portion (R28 / R22) of the HTHD' voltage which is applied to the non-inverting input. The output of the comparator is sent now to the gate of Q1 via a filter network.

This filter network also depends on the state of Q306. The VSI line can switch on and off Q306 in order to add or disconnect R309 / C304. There is thus a correction depending upon the ceiling table position.

NOTE : The J6 contacts must be shorted for an off-axis projection. **For IN - AXIS projection it is recommended to remove the strap to guarantee an optimum geometry.**

This gate voltage changes or adapts the gain of the named amplifier as long the voltages at the comparator inputs are not the same.

An increase of the line frequency means also an increase of the +HTHD' voltage, thus an increase of pin 5 voltage, so, a change of the Q1 / R31 ratio or of the gain.

By this looped circuit we obtain an automatic tracking of the east-west correction with the line frequency without any alignment.

d) Power amplifier :

The sum of the corrections is now sent back to the motherboard to be amplified by IC10 (TDA2030) before reaching the 'hor. defl.' board to modulate the scan voltage HTHD for the horizontal deflection circuits.

III. Phase control - Skew and Bow

Introduction

The midline bow and skew dynamic corrections are added to the DC phase control of the picture. These corrections change in a dynamic manner the horizontal phase of the picture during the vertical scan.

The position of the HS pulse at pin 4 of the TDA2595 is determined by the position of the pulse sent to pin 2 (Flyback Pulse Simulation). The second PLL of the TDA2595 adjusts then the Hor drive output pin 4 "back in the time" in accordance to the position of the simulated pulse.

The original pulse may now be delayed in the time to determine the start of the scanning with respect to the reference video (= phase control).

This delay happens in two steps by means of two monoflops. The first one realizes the phase control itself. The second one the skew and bow corrections. The width of the final pulse H PULS is significant for the total delay and the falling edge of this pulse triggers a third monoflop IC5 on the main board which also sets the width of the real horizontal drive pulse.

The same pulse H PULS' is also sent to the microprocessor board to lock the text and generate the pixelclock.,

a) Phase control (IC12)

The HS pulse at pin 4 triggers the monoflop IC12 on the positive going edge. The absolute value of the phase control may be lower for the high scanning frequencies than for the low scanning line frequencies. This is automatically realized by a loop system :

The pulse train at pin 5's output is integrated with R78 / C43. The obtained DC voltage across C43 is proportional with the width of the pulses (= adjusted phase) and the line frequency. The required phase shift is applied to the base of Q7 via R84 coming from IC2.

The voltage difference between the two collectors of Q7, is now the base-emitter voltage of Q6. This transistor is the current source for pin 7 (Rx / Cx) and automatically adapts the length of the output pulse to the line frequency.

The width of the output pulse is regulated by the current generator as long as the voltages at the bases of Q7 are not the same (balanced).

b) Skew and Bow Corrections

The adjusted sawtooth (skew) and parabolic (bow) waveforms are added with R44 and R42, and sent to an inverting OP AMP in IC8.

The monoflop in IC12 is triggered on the positive going edge of the pulse of pin 12. The width of the output pulse is modulated by the waveform applied via D16. Here again, the range is tracked with the line frequency by applying the HTHD' voltage through R77 / R75.

The output pulse of pin 4 is now inverted with Q8 and the "H PULS" is sent to the last monoflop (IC5) in the row located on the main board.

V. HORIZONTAL OSCILLATOR - HORIZONTAL AUTOLOCK.

a) Horizontal autolock :

The sync separator IC14 serves Q1 with composite sync.

The amplified sync is then split to the PLL (IC6) and transistor Q17 of the coincidence detector.

The line oscillator in the TDA2595 is locked to its exact frequency by a PLL in the chip. Unfortunately, the latter has a very limited lock range of approx. 1.2 kHz only and can not lock the range from 15 to 92 kHz.

An extra PLL is utilized, the **4046** (IC6), for the **coarse alignment**. The fine tuning is performed by the PLL in the TDA2595 itself.

This PLL - IC consists of two phase comparators, and a VCO.

For this application the second phase comparator only is used, the VCO is not used either.

The 'signal input' (pin 14) is the line oscillator of the TDA2595 (squared hor. drive output of the TDA2595) and the 'comparator input' (pin 3) is the composite sync having been inverted by Q1.

The corresponding output is pin 13, a three-state output, and, initially biased at 6 volts with R89 / R92.

If the output is 'high impedance or open' (in the locked state) the voltage is **set at 6 volts** with R92/89.

This voltage is buffered by a voltage follower in IC7 and then reaching pin 5 of another OPAMP, acting as a voltage comparator, in IC7.

The other input, pin 6 of IC7 is set at approximately 7.7 volts with R94 / R90.

Consequently, the **COIN NEG (pin 7) is low in the locked position.**

b) Line oscillator lower than the horizontal sync :

If we assume that the local oscillator frequency is lower than the hor. sync pulses, then, the voltage on C8 decreases (pull down state). This voltage is now buffered and sent to pin 5 of IC7. But, because of the zener Z3, this voltage cannot decrease and stays at approximately 6 volts.

The other pin 6 is initially at 7.7 volts (divider R90/R94). This voltage now decreases because the transistor Q17 discharges the capacitor C50 as follows:

The squared hor. drive of pin 4 switches on and off Q18.

When the frequency of the local line oscillator is different from the hor sync (as we assumed), some pulses arrive on the base of Q17 at the moment Q18 is not saturated.

These hor sync pulses turn on Q17 and C50 is discharged. The voltage at pin 6 drops and becomes lower than the other input, pin 5.

The output **COIN NEG (pin 7) switches 'high' in the unlocked state.**

The gate of the mosfet Q9 is now positive and Q9 conducts to connect the output pin 8 of the PLL (IC7) to the inverting input pin 2 of the next 'proportional - integrating' OP AMP.

The decreasing voltage output of the PLL is inverted by IC7 and transistor Q21 draws more current out of pin 14 of the TDA2595 in order to increase the frequency of the line oscillator.

As the line oscillator frequency is increasing, the PLL output increases also.

This continues up to the moment there is coincidence between the hor drive and the hor sync at the base of Q17.

Once coincidence is reached, the voltage at pin 6 is again 7.7 volts and the state of the Mosfet Q9 changes again to a stable and blocked position.

All this means, we have reached now the capture range of the PLL in the TDA2595. From now onwards the PLL in the TDA2595 takes over as follows :

The line frequency is fine tuned by the PLL output pin 17 of the TDA2595 , as

long this PLL output has not reached the 6 volts installed at pin 3 of IC7.

Therefore, the pin 17 output is sent to the same pin 2 of the integrating OP AMP.

In the locked state of the PLL of the TDA2595 this output is indeed 6 volts.

Any change in frequency is now compensated or corrected by the PLL of the TDA2595, and the 4046 is switched off.

Above circuit does not require any alignment as it is completely self-aligning, and guarantees a correct locking to the center of the lock range of the PLL system in the TDA2595.

c) Line oscillator higher than the hor sync :

A similar explanation is valuable here, although, in this case the PLL's output is increasing now. The zener diode Z3 does not limit the voltage because the voltage across it is not 6 volts. Pin 5 'follows' the PLL output.

As there is no coincidence as well, the other input of the comparator goes down resulting in a 'high' output for pin 7.

Q9 is turned on and the PLL output can correct the line oscillator frequency.

VI. ADJUSTABLE TOP/BOTTOM BLANKING.

On the subunit blanking pulses are generated for an adjustable blanking of the top and the bottom of the picture by the user.

To achieve a high accuracy, the sawtooth is passed into a so-called '**dead band response amplifier**' built up around an OP AMP in IC8.

The sawtooth is entered at pin 9 of IC8. The output is inverted and the ramp is steepened at the start and the end.

Two clipping levels are installed by clamping circuits in order to obtain a complete feedback between these levels (= center of the screen).

As soon the first clipping level is reached, the output is invariable, and obviously no change anymore in the output is noticed.

The transformed waveform is now sent to two level detectors in IC9.

The voltage levels of the other inputs of the comparators are regulated by the potentiometers in IC2 and IC3.

VII. SIMULATION OF THE FLYBACK PULSE FOR THE PLL OF THE TDA2595.

By means of the monoflops in IC4 a 'simulated' line (flyback) pulse is generated. The first monoflop introduces a small delay for the pulse and the second one determines the width.

The introduced delay is useful to 'mislead' the PLL and consequently to allow a 'negative' phase alignment. Indeed, this phase comparator (PLL) determines the phase of the squared output at pin 4.

It normally has to compensate for the delays in the power switching of the deflection circuits. If we can mislead this PLL by giving a 'wrong' info, the hor. output at pin 4 is shifted backwards in the time.

This allows now a range for the phase going from a 'negative' phase shift to a positive one.

VIII. BLANKING - COINCIDENCE.

In the event of a non - coincidence, the transistor Q16 gets in complete saturation since the **COIN NEG** signal is at a high level.

This results in :

- Led D20 comes on to show the non - coincidence situation.
- if the strap J5 is in its position, the transistor Q15 is also in saturation and causes a total blanking of the three crt's.

Parts listing Sync+Vertical Deflection module 76 2269 CPL

| ITEM NO. | SIT. | DESCRIPTION | ITEM NO. | SIT. | DESCRIPTION |
|----------|-------|--------------------------|----------|-------|------------------------|
| 76 2268S | UN | VER+S PJ49 G801 V_HOLD | 11 1550 | C.63C | EL RA 4M7M 50E2 85 |
| 34 84096 | CD CT | FTMT P 9 140 | 11 4068 | C.64C | POMERA 10N M 63E2 MMKO |
| 34 84124 | CD CT | FTMT P12 140 | 11 1531 | C.65C | EL RA 10M M 35E2 85 |
| 11 1487 | C..1C | EL RA 100M Z 40E2 85 | 11 3724 | C.66C | POMERA 100N K 63E2 |
| 11 3730 | C..2C | POMERA 330N K 63E2 | 11 1531 | C.67C | EL RA 10M M 35E2 85 |
| 11 2743 | C..3C | CE MI 2N2K 63E2 | 11 1477 | C.68C | EL RA 100M Z 25E2 85 |
| 11 1531 | C..4C | EL RA 10M M 35E2 85 | 11 5928 | C.69C | PP RA 3N3J 63E2 |
| 11 1678 | C..5C | EL BRA 10M M 25E2 85 | 11 5926 | C.69C | PP RA 2N7J100E2 |
| 11 1550 | C..6C | EL RA 4M7M 50E2 85 | 11 4068 | C.70C | POMERA 10N M 63E2 MMKO |
| 11 2763 | C..7C | CE MI 10N U 63E2 | 11 3724 | C.71C | POMERA 100N K 63E2 |
| 11 3724 | C..8C | POMERA 100N K 63E2 | 11 1469 | C.72C | EL RA1000M M 16E2 85 |
| 11 2762 | C..9C | CE MI 4N7U 63E2 | 11 4087 | C.73C | POMERA 470N M 63E2 |
| 11 3890 | C.10C | PETFPF 2M2K100E6 | 11 2363 | C.74C | N750MI 120P J 63E2 |
| 11 3728 | C.11C | POMERA 220N K 63E2 | 11 3724 | C.75C | POMERA 100N K 63E2 |
| 11 3728 | C.12C | POMERA 220N K 63E2 | 11 3724 | C.78C | POMERA 100N K 63E2 |
| 11 4085 | C.13C | POMERA 330N K 63E2 | 11 1531 | C.79C | EL RA 10M M 35E2 85 |
| 11 4085 | C.14C | POMERA 330N K 63E2 | 11 14909 | C.80C | EL RA1000M M 50E3 105 |
| 11 1531 | C.15C | EL RA 10M M 35E2 85 | 11 14909 | C.81C | EL RA1000M M 50E3 105 |
| 11 1531 | C.16C | EL RA 10M M 35E2 85 | 11 1531 | C.82C | EL RA 10M M 35E2 85 |
| 11 1531 | C.18C | EL RA 10M M 35E2 85 | 11 2743 | C.83C | CE MI 2N2K 63E2 |
| 11 3724 | C.19C | POMERA 100N K 63E2 | 11 1531 | C100C | EL RA 10M M 35E2 85 |
| 11 1531 | C.20C | EL RA 10M M 35E2 85 | 11 1531 | C101C | EL RA 10M M 35E2 85 |
| 11 5936 | C.21C | PP RA 6N8J 63E2 | 11 3724 | C201C | POMERA 100N K 63E2 |
| 11 1548 | C.22C | EL RA 2M2M 50E2 85 | 11 3724 | C202C | POMERA 100N K 63E2 |
| 11 1550 | C.23C | EL RA 4M7M 50E2 85 | 11 3724 | C203C | POMERA 100N K 63E2 |
| 11 2737 | C.24C | CE MI 680P K100E2 | 11 3724 | C204C | POMERA 100N K 63E2 |
| 11 3728 | C.25C | POMERA 220N K 63E2 | 11 3724 | C205C | POMERA 100N K 63E2 |
| 11 3728 | C.26C | POMERA 220N K 63E2 | 11 1571 | C206C | EL RA 2M2M350E2 85 |
| 11 2737 | C.27C | CE MI 680P K100E2 | 11 3730 | C207C | POMERA 330N K 63E2 |
| 11 2737 | C.28C | CE MI 680P K100E2 | 11 4068 | C208C | POMERA 10N M 63E2 MMKO |
| 11 3724 | C.29C | POMERA 100N K 63E2 | 11 4068 | C210C | POMERA 10N M 63E2 MMKO |
| 11 3720 | C.30C | POMERA 47N K 63E2 | 11 1531 | C604C | EL RA 10M M 35E2 85 |
| 11 4079 | C.31C | POMERA 100N M 63E2 32535 | 11 3724 | C624C | POMERA 100N K 63E2 |
| 11 3724 | C.32C | POMERA 100N K 63E2 | 11 3724 | C625C | POMERA 100N K 63E2 |
| 11 2364 | C.33C | N750MI 150P J 63E2 | 11 2763 | C634C | CE MI 10N U 63E2 |
| 11 1476 | C.34C | EL RA 47M M 25E2 85 | 13 1646 | D..1D | R 1N4007 10201A DO41 |
| 11 1488 | C.35C | EL RA 220M Z 40E2 85 | 13 1621 | D..2D | S 1N4148 075150 DO35 |
| 11 2763 | C.36C | CE MI 10N U 63E2 | 13 1621 | D..3D | S 1N4148 075150 DO35 |
| 11 1678 | C.37C | EL BRA 10M M 25E2 85 | 13 1621 | D..5D | S 1N4148 075150 DO35 |
| 11 2363 | C.38C | N750MI 120P J 63E2 | 13 1621 | D..6D | S 1N4148 075150 DO35 |
| 11 2363 | C.39C | N750MI 120P J 63E2 | 13 1621 | D..7D | S 1N4148 075150 DO35 |
| 11 3728 | C.41C | POMERA 220N K 63E2 | 13 1621 | D..8D | S 1N4148 075150 DO35 |
| 11 2737 | C.42C | CE MI 680P K100E2 | 13 16361 | D..9D | Y BAT85 030200 DO35 |
| 11 3724 | C.43C | POMERA 100N K 63E2 | 13 16361 | D.10D | Y BAT85 030200 DO35 |
| 11 3724 | C.44C | POMERA 100N K 63E2 | 13 1646 | D.11D | R 1N4007 10201A DO41 |
| 11 3724 | C.45C | POMERA 100N K 63E2 | 13 1646 | D.12D | R 1N4007 10201A DO41 |
| 11 3724 | C.46C | POMERA 100N K 63E2 | 13 1646 | D.13D | R 1N4007 10201A DO41 |
| 11 1531 | C.47C | EL RA 10M M 35E2 85 | 13 1621 | D.14D | S 1N4148 075150 DO35 |
| 11 1531 | C.48C | EL RA 10M M 35E2 85 | 13 1646 | D.15D | R 1N4007 10201A DO41 |
| 11 1531 | C.49C | EL RA 10M M 35E2 85 | 13 1621 | D.16D | S 1N4148 075150 DO35 |
| 11 3724 | C.50C | POMERA 100N K 63E2 | 13 1621 | D.18D | S 1N4148 075150 DO35 |
| 11 2362 | C.51C | N750MI 100P J 63E2 | 13 1621 | D.19D | S 1N4148 075150 DO35 |
| 11 1488 | C.52C | EL RA 220M Z 40E2 85 | 13 1662 | D.20D | LED D3 T RED |
| 11 3724 | C.53C | POMERA 100N K 63E2 | 13 1646 | D.21D | R 1N4007 10201A DO41 |
| 11 3728 | C.54C | POMERA 220N K 63E2 | 13 1621 | D.22D | S 1N4148 075150 DO35 |
| 11 1488 | C.55C | EL RA 220M Z 40E2 85 | 13 1646 | D.23D | R 1N4007 10201A DO41 |
| 11 3728 | C.56C | POMERA 220N K 63E2 | 13 1621 | D.24D | S 1N4148 075150 DO35 |
| 11 2737 | C.57C | CE MI 680P K100E2 | 13 1646 | D.25D | R 1N4007 10201A DO41 |
| 11 3728 | C.58C | POMERA 220N K 63E2 | 13 1621 | D.26D | S 1N4148 075150 DO35 |
| 11 2737 | C.59C | CE MI 680P K100E2 | 13 1621 | D.27D | S 1N4148 075150 DO35 |
| 11 37161 | C.60C | POMERA 22N K100E2 | 13 1621 | D.28D | S 1N4148 075150 DO35 |
| 11 1550 | C.61C | EL RA 4M7M 50E2 85 | 13 1621 | D.29D | S 1N4148 075150 DO35 |
| 11 1550 | C.62C | EL RA 4M7M 50E2 85 | 13 1621 | D.30D | S 1N4148 075150 DO35 |
| | | | 13 1646 | D.31D | R 1N4007 10201A DO41 |

| | | | | | |
|----------|---------------------|-------------------|----------|-----------------------|-----------------|
| 13 1646 | D.32D R 1N4007 | 10201A DO41 | 13 1411 | Q596Q BC549C | N SS TO92 030A1 |
| 13 1646 | D.33D R 1N4007 | 10201A DO41 | 13 14181 | Q611Q BC559B | P SS TO92 030A1 |
| 13 1621 | D.34D S 1N4148 | 075150 DO35 | 13 14181 | Q612Q BC559B | P SS TO92 030A1 |
| 13 16361 | D.35D Y BAT85 | 030200 DO35 | | | |
| 13 1621 | D.36D S 1N4148 | 075150 DO35 | 10 1144 | R..1R CF H 4K7 J 0W25 | |
| 13 1621 | D.37D S 1N4148 | 075150 DO35 | 10 1157 | R..3R CF H 56K J 0W25 | |
| 13 1621 | D.38D S 1N4148 | 075150 DO35 | 10 1152 | R..4R CF H 22K J 0W25 | |
| 13 1621 | D.39D S 1N4148 | 075150 DO35 | 10 1152 | R..5R CF H 22K J 0W25 | |
| 13 1621 | D.40D S 1N4148 | 075150 DO35 | 10 1165 | R..6R CF H270K J 0W25 | |
| 13 1621 | D.41D S 1N4148 | 075150 DO35 | 10 1136 | R..8R CF H 1K J 0W25 | |
| 13 1621 | D.46D S 1N4148 | 075150 DO35 | 10 1134 | R..9R CF H680E J 0W25 | |
| 13 1621 | D601D S 1N4148 | 075150 DO35 | 10 1140 | R.10R CF H 2K2 J 0W25 | |
| 13 1621 | D602D S 1N4148 | 075150 DO35 | 10 1165 | R.11R CF H270K J 0W25 | |
| 13 1621 | D603D S 1N4148 | 075150 DO35 | 10 1166 | R.12R CF H330K J 0W25 | |
| 13 1621 | D606D S 1N4148 | 075150 DO35 | 10 1150 | R.13R CF H 15K J 0W25 | |
| 13 1637 | D633D R BA158 | 600400 DO7 | 10 1160 | R.14R CF H100K J 0W25 | |
| | | | 10 1284 | R.15R CF H 10M K 0W5 | |
| 13 2762 | I..1U 2595 | TDA DIP18 PHOR | 10 1148 | R.16R CF H 10K J 0W25 | |
| 13 4002 | I..2U 7812 | TO220 PSTAB | 10 1166 | R.17R CF H330K J 0W25 | |
| 13 4016 | I..3U 7912 | TO220 PSTAB | 10 1164 | R.18R CF H220K J 0W25 | |
| 13 73325 | I..4U 4098B | DIP16 PMULTI | 10 1136 | R.19R CF H 1K J 0W25 | |
| 13 73325 | I..5U 4098B | DIP16 PMULTI | 10 1124 | R.20R CF H100E J 0W25 | |
| 13 7602 | I..6U 4046B | DIP16 PLL | 10 1168 | R.23R CF H470K J 0W25 | |
| 13 4113 | I..7U 084 | TL DIP14 POPAMP | 10 1168 | R.24R CF H470K J 0W25 | |
| 13 4025 | I..8U 78L24 | TO92 PSTAB | 10 1141 | R.25R CF H 2K7 J 0W25 | |
| 13 4116 | I..9U 353 | LF DIP8 POPAMP | 10 1150 | R.26R CF H 15K J 0W25 | |
| 13 2751 | I.10U 2030V | TDA TO220T PAUD12 | 10 1115 | R.27R CF H 18E J 0W25 | |
| 13 2827 | I.11U 8172 | TDA H_W PVERT | 10 1148 | R.28R CF H 10K J 0W25 | |
| 13 2827 | I.12U 8172 | TDA H_W PVERT | 10 1148 | R.29R CF H 10K J 0W25 | |
| 13 2827 | I.13U 8172 | TDA H_W PVERT | 10 1130 | R.30R CF H330E J 0W25 | |
| 13 2817 | I.14U 1881 | LM DIP8 PSEPAR | 10 1156 | R.31R CF H 47K J 0W25 | |
| | | | 10 1133 | R.32R CF H560E J 0W25 | |
| 31 3525 | J..1J EUR2C MBS P64 | E1C2S 1.6 | 10 1152 | R.33R CF H 22K J 0W25 | |
| 31 3525 | J..2J EUR2C MBS P64 | E1C2S 1.6 | 10 1148 | R.34R CF H 10K J 0W25 | |
| 31 32862 | J..5J MD1 | MBT P 2 E1SN | 10 1154 | R.35R CF H 33K J 0W25 | |
| | | | 10 1138 | R.36R CF H 1K5 J 0W25 | |
| 77 4223 | L..1CH FAN PJ49 | CTRL | 10 1149 | R.37R CF H 12K J 0W25 | |
| 77 4223 | L..2CH FAN PJ49 | CTRL | 10 1134 | R.38R CF H680E J 0W25 | |
| | | | 10 1141 | R.39R CF H 2K7 J 0W25 | |
| 10 6836 | P..1R TCE V500K | K 0W5 S10SS3386H | 10 1148 | R.41R CF H 10K J 0W25 | |
| 10 6833 | P..2R TCE V100K | K 0W5 S10SS3386H | 10 1146 | R.42R CF H 6K8 J 0W25 | |
| 10 75301 | P620R MCE H100K | K 0W5 M10SS3296P | 10 11584 | R.43R MF H 68K F 0W25 | |
| 10 75301 | P621R MCE H100K | K 0W5 M10SS3296P | 10 2604 | R.44R MF H 2E2 F 0W4 | MK2 |
| 10 6827 | P626R TCE V 2K | K 0W5 S10SS3386H | 10 1124 | R.45R CF H100E J 0W25 | |
| 10 6827 | P627R TCE V 2K | K 0W5 S10SS3386H | 10 11504 | R.47R MF H 15K F 0W25 | |
| | | | 10 1100 | R.48R CF H 1E J 0W25 | 211 |
| 78 0017 | PC..PCD PJ49 | 801 VER 03 | 10 11484 | R.49R MF H 10K F 0W25 | |
| | | | 10 1148 | R.50R CF H 10K J 0W25 | |
| 13 14182 | Q..1Q BC559C | P SS TO92 030A1 | 10 1108 | R.51R CF H 4E7 J 0W25 | SK2 |
| 13 14295 | Q..2Q BC549B | N SS TO92 030A1 | 10 1136 | R.52R CF H 1K J 0W25 | |
| 13 14181 | Q..3Q BC559B | P SS TO92 030A1 | 10 1160 | R.53R CF H100K J 0W25 | |
| 13 1411 | Q..4Q BC549C | N SS TO92 030A1 | 10 1161 | R.54R CF H120K J 0W25 | |
| 13 1411 | Q..5Q BC549C | N SS TO92 030A1 | 10 1100 | R.55R CF H 1E J 0W25 | 211 |
| 13 2910 | Q..6Q BS170 | FN SS TO92 060A5 | 10 11484 | R.56R MF H 10K F 0W25 | |
| 13 1411 | Q..7Q BC549C | N SS TO92 030A1 | 10 11605 | R.57R MF H100K F 0W25 | |
| 13 14072 | Q..8Q BC547A | N SS TO92 045A1 | 10 11484 | R.58R MF H 10K F 0W25 | |
| 13 14651 | Q..9Q BF245B | FN SS TO92 03006 | 10 1146 | R.59R CF H 6K8 J 0W25 | |
| 13 1411 | Q.10Q BC549C | N SS TO92 030A1 | 10 1146 | R.60R CF H 6K8 J 0W25 | |
| 13 14295 | Q.11Q BC549B | N SS TO92 030A1 | 10 1124 | R.61R CF H100E J 0W25 | |
| 13 14181 | Q.12Q BC559B | P SS TO92 030A1 | 10 1136 | R.62R CF H 1K J 0W25 | |
| 13 14295 | Q.14Q BC549B | N SS TO92 030A1 | 10 1124 | R.63R CF H100E J 0W25 | |
| 13 14131 | Q.15Q BC557B | P SS TO92 045A1 | 10 1156 | R.64R CF H 47K J 0W25 | |
| 13 1411 | Q.16Q BC549C | N SS TO92 030A1 | 10 1147 | R.65R CF H 8K2 J 0W25 | |
| 13 1411 | Q.17Q BC549C | N SS TO92 030A1 | 10 1148 | R.66R CF H 10K J 0W25 | |
| 13 14295 | Q.18Q BC549B | N SS TO92 030A1 | 10 1152 | R.67R CF H 22K J 0W25 | |
| 13 1411 | Q.19Q BC549C | N SS TO92 030A1 | 10 1140 | R.68R CF H 2K2 J 0W25 | |
| 13 1411 | Q.20Q BC549C | N SS TO92 030A1 | 10 1124 | R.69R CF H100E J 0W25 | |
| 13 14295 | Q.21Q BC549B | N SS TO92 030A1 | 10 1124 | R.70R CF H100E J 0W25 | |

| | | | | | |
|----------|-------|-----------|-----------|--------|--|
| 10 1124 | R.71R | CF H100E | J 0W25 | | |
| 10 1158 | R.72R | CF H 68K | J 0W25 | | |
| 10 1150 | R.73R | CF H 15K | J 0W25 | | |
| 10 1155 | R.74R | CF H 39K | J 0W25 | | |
| 10 1155 | R.75R | CF H 39K | J 0W25 | | |
| 10 1124 | R.76R | CF H100E | J 0W25 | | |
| 10 1100 | R.77R | CF H 1E | J 0W25 | 211 | |
| 10 11504 | R.78R | MF H 15K | F 0W25 | | |
| 10 2604 | R.79R | MF H 2E2 | F 0W4 | MK2 | |
| 10 1100 | R.80R | CF H 1E | J 0W25 | 211 | |
| 10 1124 | R.81R | CF H100E | J 0W25 | | |
| 10 1152 | R.82R | CF H 22K | J 0W25 | | |
| 10 1152 | R.83R | CF H 22K | J 0W25 | | |
| 10 1148 | R.84R | CF H 10K | J 0W25 | | |
| 10 1152 | R.85R | CF H 22K | J 0W25 | | |
| 10 1148 | R.86R | CF H 10K | J 0W25 | | |
| 10 1148 | R.87R | CF H 10K | J 0W25 | | |
| 10 1152 | R.88R | CF H 22K | J 0W25 | | |
| 10 1145 | R.89R | CF H 5K6 | J 0W25 | | |
| 10 1160 | R.90R | CF H100K | J 0W25 | | |
| 10 1158 | R.91R | CF H 68K | J 0W25 | | |
| 10 1146 | R.92R | CF H 6K8 | J 0W25 | | |
| 10 1134 | R.93R | CF H680E | J 0W25 | | |
| 10 1158 | R.94R | CF H 68K | J 0W25 | | |
| 10 1148 | R.95R | CF H 10K | J 0W25 | | |
| 10 1148 | R.96R | CF H 10K | J 0W25 | | |
| 10 2604 | R.97R | MF H 2E2 | F 0W4 | MK2 | |
| 10 11504 | R.98R | MF H 15K | F 0W25 | | |
| 10 1148 | R.99R | CF H 10K | J 0W25 | | |
| 10 1148 | R100R | CF H 10K | J 0W25 | | |
| 10 11644 | R101R | MF H220K | J 0W25 | | |
| 10 1556 | R102R | MF H 47K | F 0W4 | E2 | |
| 10 1148 | R103R | CF H 10K | J 0W25 | | |
| 10 1148 | R104R | CF H 10K | J 0W25 | | |
| 10 1149 | R105R | CF H 12K | J 0W25 | | |
| 10 1148 | R106R | CF H 10K | J 0W25 | | |
| 10 1148 | R107R | CF H 10K | J 0W25 | | |
| 10 11544 | R108R | MF H 33K | J 0W25 | | |
| 10 1143 | R109R | CF H 3K9 | J 0W25 | | |
| 10 1139 | R110R | CF H 1K8 | J 0W25 | | |
| 10 1542 | R111R | MF H 3K3 | F 0W4 | E2 | |
| 10 11403 | R111R | MF H 2K | F 0W25 | | |
| 10 1112 | R112R | CF H 10E | J 0W25 | | |
| 10 1149 | R113R | CF H 12K | J 0W25 | | |
| 10 1539 | R114R | MF H 1K8 | F 0W4 | E2 | |
| 10 1141 | R114R | CF H 2K7 | J 0W25 | | |
| 10 1148 | R115R | CF H 10K | J 0W25 | | |
| 10 1551 | R116R | MF H 18K | F 0W4 | E2 | |
| 10 24378 | R116R | MF H 24K3 | F 0W25 | MK2 | |
| 10 1135 | R117R | CF H820E | J 0W25 | | |
| 10 1160 | R118R | CF H100K | J 0W25 | | |
| 10 1144 | R119R | CF H 4K7 | J 0W25 | | |
| 10 1556 | R120R | MF H 47K | F 0W4 | E2 | |
| 10 1154 | R120R | CF H 33K | J 0W25 | | |
| 10 1228 | R121R | CF H220E | J 0W5 | | |
| 10 1149 | R122R | CF H 12K | J 0W25 | | |
| 10 1147 | R123R | CF H 8K2 | J 0W25 | | |
| 10 1156 | R127R | CF H 47K | J 0W25 | | |
| 10 1166 | R201R | CF H330K | J 0W25 | | |
| 10 1166 | R202R | CF H330K | J 0W25 | | |
| 10 1152 | R203R | CF H 22K | J 0W25 | | |
| 10 1152 | R301R | CF H 22K | J 0W25 | | |
| 10 1152 | R302R | CF H 22K | J 0W25 | | |
| 10 1125 | R303R | CF H120E | J 0W25 | | |
| 10 1167 | R304R | CF H390K | J 0W25 | | |
| 10 1146 | R305R | CF H 6K8 | J 0W25 | | |
| 10 1140 | R306R | CF H 2K2 | J 0W25 | | |
| 10 1137 | R307R | CF H 1K2 | J 0W25 | | |
| 10 11465 | R308R | MF H 6K8 | F 0W25 | | |
| 10 1136 | R598R | CF H 1K | J 0W25 | | |
| 10 1136 | R599R | CF H 1K | J 0W25 | | |
| 10 1127 | R600R | CF H180E | J 0W25 | | |
| 10 1131 | R605R | CF H390E | J 0W25 | | |
| 10 1148 | R607R | CF H 10K | J 0W25 | | |
| 10 1127 | R608R | CF H180E | J 0W25 | | |
| 10 1152 | R609R | CF H 22K | J 0W25 | | |
| 10 0148 | R610R | CF V 10K | J 0W25 | E2 | |
| 10 0160 | R613R | CF V100K | J 0W25 | E2 | |
| 10 0158 | R614R | CF V 68K | J 0W25 | E2 | |
| 10 0160 | R615R | CF V100K | J 0W25 | E2 | |
| 10 1126 | R616R | CF H150E | J 0W25 | | |
| 10 0140 | R617R | CF V 2K2 | J 0W25 | E2 | |
| 10 1126 | R618R | CF H150E | J 0W25 | | |
| 10 0140 | R619R | CF V 2K2 | J 0W25 | E2 | |
| 10 1171 | R622R | CF H820K | J 0W25 | | |
| 10 1171 | R623R | CF H820K | J 0W25 | | |
| 10 11481 | R628R | CF H 9K1 | J 0W25 | | |
| 10 11481 | R629R | CF H 9K1 | J 0W25 | | |
| 10 11917 | SR.1R | CFFH | E22K 0W4 | | |
| 10 11907 | SR.2R | CFFH | E1 J 0W4 | | |
| 10 11009 | SR.3R | CFFH | 1E J 0W25 | SKS2 | |
| 13 1768 | Z..1D | ZEN | 7V5 0W5 | B DO35 | |
| 13 1734 | Z..2D | ZEN | 5V6 0W5 | B DO35 | |
| 13 1734 | Z..3D | ZEN | 5V6 0W5 | B DO35 | |

Parts listing Sub module 76 2268S

| ITEM NO. | SIT. | DESCRIPTION | ITEM NO. | SIT. | DESCRIPTION |
|----------|------|-------------------------|----------|------|-----------------------|
| 11 1678 | C..1 | C EL BRA 10M M 25E2 85 | 11 3724 | C.15 | C POMERA 100N K 63E2 |
| 11 3724 | C..2 | C POMERA 100N K 63E2 | 11 1550 | C.16 | C EL RA 4M7M 50E2 85 |
| 11 1531 | C..3 | C EL RA 10M M 35E2 85 | 11 3724 | C.17 | C POMERA 100N K 63E2 |
| 11 1468 | C..4 | C EL RA 470M Z 16E2 85 | 11 4090 | C.18 | C POMERA 1M M 63E2 |
| 11 3724 | C..5 | C POMERA 100N K 63E2 | 11 1550 | C.19 | C EL RA 4M7M 50E2 85 |
| 11 37121 | C..6 | C POMERA 10N K100E2 365 | 11 3724 | C.20 | C POMERA 100N K 63E2 |
| 11 37121 | C..7 | C POMERA 10N K100E2 365 | 11 4090 | C.21 | C POMERA 1M M 63E2 |
| 11 1531 | C..8 | C EL RA 10M M 35E2 85 | 11 4090 | C.22 | C POMERA 1M M 63E2 |
| 11 3724 | C..9 | C POMERA 100N K 63E2 | 11 1500 | C.23 | C EL RA 47M M 10E2 85 |
| 11 3724 | C.10 | C POMERA 100N K 63E2 | 11 1531 | C.24 | C EL RA 10M M 35E2 85 |
| 11 3732 | C.11 | C POMERA 470N K 63E2 | 11 3724 | C.25 | C POMERA 100N K 63E2 |
| 11 3819 | C.12 | C POMERA 3N3J250E2 1817 | 11 1531 | C.26 | C EL RA 10M M 35E2 85 |
| 11 14885 | C.13 | C EL RA 220M Z 40E2 85 | 11 3724 | C.27 | C POMERA 100N K 63E2 |
| 11 1550 | C.14 | C EL RA 4M7M 50E2 85 | 11 3732 | C.28 | C POMERA 470N K 63E2 |

| | | | | | | |
|----------|------|-------------------------|-----|----------|------|-------------------------------|
| 11 3724 | C.29 | C POMERA 100N K 63E2 | | 31 3947 | J..5 | J CT MBS P 7 M2SN |
| 11 27475 | C.30 | C CE MI 4N7K 63E2 | | 31 3276 | J..6 | J MD1 MBT P10 R1SN |
| 11 27475 | C.31 | C CE MI 4N7K 63E2 | | | | |
| 11 1531 | C.32 | C EL RA 10M M 35E2 85 | | 10 6727 | P..1 | R TCE H 2K K 0W5 S10TS3386P |
| 11 1531 | C.33 | C EL RA 10M M 35E2 85 | | 10 6729 | P..2 | R TCE H 10K K 0W5 S10TS3386P |
| 11 2741 | C.34 | C CE MI 1N5K 63E2 | | | | |
| 11 37181 | C.35 | C POMERA 33N K100E2 | | 78 0018 | PC.. | PCS PJ49 800 VER SUB 762268S |
| 11 3730 | C.36 | C POMERA 330N K 63E2 | | | | |
| 11 37151 | C.37 | C POMERA 18N K100E2 | | 13 14651 | Q..1 | Q BF245B FN SS TO92 03006 |
| 11 37121 | C.38 | C POMERA 10N K100E2 | 365 | 13 14295 | Q..2 | Q BC549B N SS TO92 030A1 |
| 11 1531 | C.39 | C EL RA 10M M 35E2 85 | | 13 14295 | Q..3 | Q BC549B N SS TO92 030A1 |
| 11 2242 | C.40 | C NPO MI 100P J 63E2 | | 13 1411 | Q..4 | Q BC549C N SS TO92 030A1 |
| 11 1230 | C.41 | C EL AX 22M T160E12 85 | | 13 14181 | Q..6 | Q BC559B P SS TO92 030A1 |
| 11 3724 | C.42 | C POMERA 100N K 63E2 | | 13 2944 | Q..7 | Q BCY87 2N SS TO71 040A2 |
| 11 3724 | C.43 | C POMERA 100N K 63E2 | | 13 1491 | Q..8 | Q BSX20 .2369 N SS TO18 015A2 |
| 11 2242 | C.44 | C NPO MI 100P J 63E2 | | 13 2910 | Q.10 | Q BS170 FN SS TO92 060A5 |
| 11 1531 | C.45 | C EL RA 10M M 35E2 85 | | 13 1411 | Q.11 | Q BC549C N SS TO92 030A1 |
| 11 1531 | C.46 | C EL RA 10M M 35E2 85 | | 13 14181 | Q306 | Q BC559B P SS TO92 030A1 |
| 11 1531 | C.47 | C EL RA 10M M 35E2 85 | | 13 14181 | Q312 | Q BC559B P SS TO92 030A1 |
| 11 1531 | C.48 | C EL RA 10M M 35E2 85 | | | | |
| 11 1500 | C.49 | C EL RA 47M M 10E2 85 | | 10 1154 | R..1 | R CF H 33K J 0W25 |
| 11 27475 | C.50 | C CE MI 4N7K 63E2 | | 10 1140 | R..2 | R CF H 2K2 J 0W25 |
| 11 2739 | C.51 | C CE MI 1N K100E2 | | 10 1144 | R..9 | R CF H 4K7 J 0W25 |
| 11 2741 | C.52 | C CE MI 1N5K 63E2 | | 10 1144 | R.10 | R CF H 4K7 J 0W25 |
| 11 1500 | C.53 | C EL RA 47M M 10E2 85 | | 10 1126 | R.11 | R CF H150E J 0W25 |
| 11 2743 | C214 | C CE MI 2N2K 63E2 | | 10 1130 | R.12 | R CF H330E J 0W25 |
| 11 1546 | C219 | C EL RA 1M M 50E2 85 | | 10 1136 | R.13 | R CF H 1K J 0W25 |
| 11 37121 | C300 | C POMERA 10N K100E2 | 365 | 10 1136 | R.14 | R CF H 1K J 0W25 |
| 11 3724 | C302 | C POMERA 100N K 63E2 | | 10 1135 | R.16 | R CF H820E J 0W25 |
| 11 4090 | C304 | C POMERA 1M M 63E2 | | 10 1135 | R.17 | R CF H820E J 0W25 |
| 11 1500 | C368 | C EL RA 47M M 10E2 85 | | 10 1137 | R.18 | R CF H 1K2 J 0W25 |
| | | | | 10 1124 | R.19 | R CF H100E J 0W25 |
| 13 1621 | D..1 | D S 1N4148 075150 DO35 | | 10 1148 | R.20 | R CF H 10K J 0W25 |
| 13 1621 | D..2 | D S 1N4148 075150 DO35 | | 10 1141 | R.21 | R CF H 2K7 J 0W25 |
| 13 16361 | D..3 | D Y BAT85 030200 DO35 | | 10 1136 | R.22 | R CF H 1K J 0W25 |
| 13 16361 | D..4 | D Y BAT85 030200 DO35 | | 10 1136 | R.23 | R CF H 1K J 0W25 |
| 13 16361 | D..5 | D Y BAT85 030200 DO35 | | 10 1148 | R.24 | R CF H 10K J 0W25 |
| 13 1621 | D..6 | D S 1N4148 075150 DO35 | | 10 1140 | R.26 | R CF H 2K2 J 0W25 |
| 13 16361 | D..7 | D Y BAT85 030200 DO35 | | 10 1160 | R.27 | R CF H100K J 0W25 |
| 13 1621 | D..8 | D S 1N4148 075150 DO35 | | 10 1153 | R.28 | R CF H 27K J 0W25 |
| 13 1621 | D..9 | D S 1N4148 075150 DO35 | | 10 1116 | R.29 | R CF H 22E J 0W25 |
| 13 1621 | D.10 | D S 1N4148 075150 DO35 | | 10 1168 | R.30 | R CF H470K J 0W25 |
| 13 1621 | D.11 | D S 1N4148 075150 DO35 | | 10 1141 | R.31 | R CF H 2K7 J 0W25 |
| 13 1621 | D.12 | D S 1N4148 075150 DO35 | | 10 1134 | R.32 | R CF H680E J 0W25 |
| 13 1621 | D.13 | D S 1N4148 075150 DO35 | | 10 1141 | R.35 | R CF H 2K7 J 0W25 |
| 13 1621 | D.14 | D S 1N4148 075150 DO35 | | 10 1148 | R.37 | R CF H 10K J 0W25 |
| 13 16361 | D.15 | D Y BAT85 030200 DO35 | | 10 1156 | R.38 | R CF H 47K J 0W25 |
| 13 16361 | D.16 | D Y BAT85 030200 DO35 | | 10 1144 | R.39 | R CF H 4K7 J 0W25 |
| 13 1639 | D.17 | D S BAX12 090400 DO35 | | 10 1147 | R.40 | R CF H 8K2 J 0W25 |
| 13 1621 | D.18 | D S 1N4148 075150 DO35 | | 10 1156 | R.41 | R CF H 47K J 0W25 |
| 13 1637 | D377 | D R BA158 600400 DO7 | | 10 1148 | R.42 | R CF H 10K J 0W25 |
| | | | | 10 1136 | R.43 | R CF H 1K J 0W25 |
| 13 2833 | I..1 | U 76013 SC DIP28 PD_POT | | 10 1148 | R.44 | R CF H 10K J 0W25 |
| 13 2833 | I..2 | U 76013 SC DIP28 PD_POT | | 10 1136 | R.45 | R CF H 1K J 0W25 |
| 13 2833 | I..3 | U 76013 SC DIP28 PD_POT | | 10 1150 | R.46 | R CF H 15K J 0W25 |
| 13 4028 | I..4 | U 317LZ TO92 PSTAB | | 10 1154 | R.47 | R CF H 33K J 0W25 |
| 13 4029 | I..5 | U 337LZ TO92 PSTAB | | 10 1154 | R.48 | R CF H 33K J 0W25 |
| 13 4032 | I..6 | U 78L05 TO92 PSTAB | | 10 1167 | R.49 | R CF H390K J 0W25 |
| 13 4113 | I..7 | U 084 TL DIP14 POPAMP | | 10 1154 | R.50 | R CF H 33K J 0W25 |
| 13 4113 | I..8 | U 084 TL DIP14 POPAMP | | 10 1154 | R.51 | R CF H 33K J 0W25 |
| 13 4114 | I..9 | U 393 LM DIP8 PV_COM | | 10 1150 | R.52 | R CF H 15K J 0W25 |
| 13 7397 | I.10 | U 4013B DIP14 PFL_FL | | 10 1124 | R.53 | R CF H100E J 0W25 |
| 13 4124 | I.11 | U 082 TL DIP8 POPAMP | | 10 1124 | R.54 | R CF H100E J 0W25 |
| 13 7552 | I.12 | U 74HCT123 DIP16 PMULTV | | 10 1168 | R.55 | R CF H470K J 0W25 |
| 13 4222 | I336 | U 1495 MC DIL14 P | | 10 1148 | R.57 | R CF H 10K J 0W25 |
| | | | | 10 1141 | R.58 | R CF H 2K7 J 0W25 |
| 31 3949 | J..3 | J CT MBS P 9 M2SN | | 10 1158 | R.59 | R CF H 68K J 0W25 |
| 31 3952 | J..4 | J CT MBS P12 M2SN | | 10 1128 | R.60 | R CF H220E J 0W25 |

| | | | | | | | |
|---------|------|-------------------|-----|---------|------|---------------------|--|
| 10 1148 | R.61 | R CF H 10K J 0W25 | | 10 1148 | R.93 | R CF H 10K J 0W25 | |
| 10 1149 | R.62 | R CF H 12K J 0W25 | | 10 1140 | R.94 | R CF H 2K2 J 0W25 | |
| 10 1130 | R.63 | R CF H330E J 0W25 | | 10 1138 | R.95 | R CF H 1K5 J 0W25 | |
| 10 1119 | R.64 | R CF H 39E J 0W25 | | 10 1142 | R.96 | R CF H 3K3 J 0W25 | |
| 10 1125 | R.65 | R CF H120E J 0W25 | | 10 1146 | R.97 | R CF H 6K8 J 0W25 | |
| 10 1124 | R.67 | R CF H100E J 0W25 | | 10 1154 | R.98 | R CF H 33K J 0W25 | |
| 10 1124 | R.68 | R CF H100E J 0W25 | | 10 1154 | R.99 | R CF H 33K J 0W25 | |
| 10 1152 | R.69 | R CF H 22K J 0W25 | | 10 1148 | R212 | R CF H 10K J 0W25 | |
| 10 1152 | R.70 | R CF H 22K J 0W25 | | 10 1148 | R213 | R CF H 10K J 0W25 | |
| 10 1160 | R.71 | R CF H100K J 0W25 | | 10 1136 | R217 | R CF H 1K J 0W25 | |
| 10 1135 | R.72 | R CF H820E J 0W25 | | 10 1160 | R218 | R CF H100K J 0W25 | |
| 10 1152 | R.73 | R CF H 22K J 0W25 | | 10 1148 | R222 | R CF H 10K J 0W25 | |
| 10 1116 | R.74 | R CF H 22E J 0W25 | | 10 1124 | R301 | R CF H100E J 0W25 | |
| 10 1159 | R.75 | R CF H 82K J 0W25 | | 10 1148 | R307 | R CF H 10K J 0W25 | |
| 10 1136 | R.76 | R CF H 1K J 0W25 | | 10 1148 | R308 | R CF H 10K J 0W25 | |
| 10 1146 | R.77 | R CF H 6K8 J 0W25 | | 10 1149 | R309 | R CF H 12K J 0W25 | |
| 10 1149 | R.78 | R CF H 12K J 0W25 | | 10 1152 | R311 | R CF H 22K J 0W25 | |
| 10 1148 | R.79 | R CF H 10K J 0W25 | | 10 1132 | R363 | R CF H470E J 0W25 | |
| 10 1124 | R.80 | R CF H100E J 0W25 | | 10 1136 | R364 | R CF H 1K J 0W25 | |
| 10 1136 | R.81 | R CF H 1K J 0W25 | | 10 1139 | R365 | R CF H 1K8 J 0W25 | |
| 10 1137 | R.82 | R CF H 1K2 J 0W25 | | 10 1136 | R366 | R CF H 1K J 0W25 | |
| 10 1148 | R.83 | R CF H 10K J 0W25 | | 10 1126 | R367 | R CF H150E J 0W25 | |
| 10 1148 | R.84 | R CF H 10K J 0W25 | | | | | |
| 10 1104 | R.85 | R CF H 2E2 J 0W25 | 181 | 13 1704 | Z..1 | D STB 2V8 0W4 C DO7 | |
| 10 1229 | R.86 | R CF H270E J 0W5 | | | | | |
| 10 1144 | R.87 | R CF H 4K7 J 0W25 | | | | | |
| 10 1148 | R.88 | R CF H 10K J 0W25 | | | | | |
| 10 1172 | R.89 | R CF H 1M J 0W25 | | | | | |
| 10 1148 | R.90 | R CF H 10K J 0W25 | | | | | |
| 10 1147 | R.91 | R CF H 8K2 J 0W25 | | | | | |
| 10 1148 | R.92 | R CF H 10K J 0W25 | | | | | |

Parts listing Orbiting module 76 2268U (Option)

| ITEM NO. | SIT. | DESCRIPTION | ITEM NO. | SIT. | DESCRIPTION |
|----------|------|-------------------------|----------|-------|--------------------------|
| 34 84071 | | CD CT FWT MBS P 7 L 110 | 13 1621 | D..7 | D S 1N4148 075150 DO35 |
| | | | 13 1621 | D..8 | D S 1N4148 075150 DO35 |
| 11 3728 | C..1 | C POMERA 220N K 63E2 | 13 2833 | I..1 | U 76013 SC DIP28 PD_POT |
| 11 1531 | C..2 | C EL RA 10M M 35E2 85 | 13 2832 | I..2 | U 8574A PCF DIP16 PEXP |
| 11 1531 | C..3 | C EL RA 10M M 35E2 85 | 13 4113 | I..3 | U 084 TL DIP14 POPAMP |
| 11 3724 | C..4 | C POMERA 100N K 63E2 | 13 7600 | I..4 | U 4052B DIP16 PM/DEM |
| 11 3724 | C..5 | C POMERA 100N K 63E2 | 13 4113 | I..5 | U 084 TL DIP14 POPAMP |
| 11 1478 | C..6 | C EL RA 220M Z 25E2 85 | 13 7303 | I..6 | U 4066B DIP14 PSWTCH |
| 11 3728 | C..7 | C POMERA 220N K 63E2 | 13 4029 | I..9 | U 337LZ TO92 PSTAB |
| 11 3728 | C..8 | C POMERA 220N K 63E2 | 13 4028 | I..26 | U 317LZ TO92 PSTAB |
| 11 3728 | C..9 | C POMERA 220N K 63E2 | | | |
| 11 3728 | C.10 | C POMERA 220N K 63E2 | 31 3943 | J..2 | J CT MBS P 3 M2SN |
| 11 1478 | C.11 | C EL RA 220M Z 25E2 85 | | | |
| 11 1478 | C.12 | C EL RA 220M Z 25E2 85 | 78 0224 | PC.. | PCD PJ49 800 ORBIT 2 |
| 11 1478 | C.13 | C EL RA 220M Z 25E2 85 | | | |
| 11 3728 | C.14 | C POMERA 220N K 63E2 | 13 14181 | Q..1 | Q BC559B P SS TO92 030A1 |
| 11 1531 | C.15 | C EL RA 10M M 35E2 85 | 13 14181 | Q..2 | Q BC559B P SS TO92 030A1 |
| 11 1531 | C.16 | C EL RA 10M M 35E2 85 | 13 14181 | Q..3 | Q BC559B P SS TO92 030A1 |
| 11 3724 | C.17 | C POMERA 100N K 63E2 | 13 2916 | Q..4 | Q BS250 FN SS TO92 045A2 |
| 11 3724 | C.18 | C POMERA 100N K 63E2 | 13 1411 | Q..5 | Q BC549C N SS TO92 030A1 |
| 11 3724 | C.19 | C POMERA 100N K 63E2 | | | |
| 11 3724 | C.20 | C POMERA 100N K 63E2 | 10 1544 | R..1 | R MF H 4K7 F 0W4 E2 |
| 11 3724 | C.21 | C POMERA 100N K 63E2 | 10 1544 | R..2 | R MF H 4K7 F 0W4 E2 |
| 13 1621 | D..1 | D S 1N4148 075150 DO35 | 10 1529 | R..3 | R MF H270E F 0W4 E2 |
| 13 1621 | D..2 | D S 1N4148 075150 DO35 | 10 1548 | R..4 | R MF H 10K F 0W4 E2 |
| 13 1621 | D..3 | D S 1N4148 075150 DO35 | 10 1554 | R..5 | R MF H 33K F 0W4 E2 |
| 13 1621 | D..4 | D S 1N4148 075150 DO35 | 10 1524 | R..6 | R MF H100E F 0W4 E2 |
| 13 1621 | D..5 | D S 1N4148 075150 DO35 | 10 1529 | R..7 | R MF H270E F 0W4 E2 |
| 13 1621 | D..6 | D S 1N4148 075150 DO35 | 10 1564 | R..8 | R MF H220K F 0W4 E2 |

| | | | | | |
|---------|------|---------------------|---------|------|---------------------|
| 10 1554 | R.9 | R MF H 33K F 0W4 E2 | 10 1564 | R.34 | R MF H220K F 0W4 E2 |
| 10 1542 | R.10 | R MF H 3K3 F 0W4 E2 | 10 1560 | R.35 | R MF H100K F 0W4 E2 |
| 10 1555 | R.11 | R MF H 39K F 0W4 E2 | 10 1560 | R.36 | R MF H100K F 0W4 E2 |
| 10 1519 | R.12 | R MF H 39E F 0W4 E2 | 10 1556 | R.37 | R MF H 47K F 0W4 E2 |
| 10 1525 | R.13 | R MF H120E F 0W4 E2 | 10 1556 | R.38 | R MF H 47K F 0W4 E2 |
| 10 1548 | R.14 | R MF H 10K F 0W4 E2 | 10 1524 | R.39 | R MF H100E F 0W4 E2 |
| 10 1548 | R.15 | R MF H 10K F 0W4 E2 | 10 1528 | R.40 | R MF H220E F 0W4 E2 |
| 10 1544 | R.16 | R MF H 4K7 F 0W4 E2 | 10 1530 | R.41 | R MF H330E F 0W4 E2 |
| 10 1548 | R.17 | R MF H 10K F 0W4 E2 | 10 1548 | R.42 | R MF H 10K F 0W4 E2 |
| 10 1542 | R.18 | R MF H 3K3 F 0W4 E2 | 10 1552 | R.43 | R MF H 22K F 0W4 E2 |
| 10 1544 | R.19 | R MF H 4K7 F 0W4 E2 | 10 1548 | R.44 | R MF H 10K F 0W4 E2 |
| 10 1542 | R.20 | R MF H 3K3 F 0W4 E2 | 10 1552 | R.45 | R MF H 22K F 0W4 E2 |
| 10 1542 | R.21 | R MF H 3K3 F 0W4 E2 | 10 1552 | R.46 | R MF H 22K F 0W4 E2 |
| 10 1550 | R.22 | R MF H 15K F 0W4 E2 | 10 1548 | R.47 | R MF H 10K F 0W4 E2 |
| 10 1555 | R.23 | R MF H 39K F 0W4 E2 | 10 1552 | R.48 | R MF H 22K F 0W4 E2 |
| 10 1560 | R.24 | R MF H100K F 0W4 E2 | 10 1552 | R.49 | R MF H 22K F 0W4 E2 |
| 10 1567 | R.25 | R MF H390K F 0W4 E2 | 10 1548 | R.50 | R MF H 10K F 0W4 E2 |
| 10 1567 | R.26 | R MF H390K F 0W4 E2 | 10 1536 | R.51 | R MF H 1K F 0W4 E2 |
| 10 1550 | R.27 | R MF H 15K F 0W4 E2 | 10 1536 | R.52 | R MF H 1K F 0W4 E2 |
| 10 1556 | R.28 | R MF H 47K F 0W4 E2 | | | |
| 10 1556 | R.29 | R MF H 47K F 0W4 E2 | | | |
| 10 1562 | R.30 | R MF H150K F 0W4 E2 | | | |
| 10 1560 | R.31 | R MF H100K F 0W4 E2 | | | |
| 10 1562 | R.32 | R MF H150K F 0W4 E2 | | | |
| 10 1554 | R.33 | R MF H 33K F 0W4 E2 | | | |

Sync+Vertical Deflection module

76 2269

Spare parts Sync+Vertical Deflection module 76 2269 CPL

| ART NO. | DESCRIPTION | QUANTITY | ART NO. | DESCRIPTION | QUANTITY |
|---------|-------------|----------|---------|-------------|----------|
|---------|-------------|----------|---------|-------------|----------|

Spare parts Sub module 76 2268S

| ART NO. | DESCRIPTION | QUANTITY | ART NO. | DESCRIPTION | QUANTITY |
|----------|------------------------------|----------|----------|-------------------------|----------|
| 10 6727 | R TCE H 2K K OW5 S10TS3386P | 1 | 13 4028 | U 317LZ TO92 PSTAB | 1 |
| 10 6729 | R TCE H 10K K OW5 S10TS3386P | 1 | 13 4029 | U 337LZ TO92 PSTAB | 1 |
| | | | 13 4032 | U 78L05 TO92 PSTAB | 1 |
| 13 1411 | Q BC549C N SS TO92 030A1 | 2 | 13 4113 | U 084 TL DIP14 POPAMP | 2 |
| 13 14181 | Q BC559B P SS TO92 030A1 | 3 | 13 4114 | U 393 LM DIP8 PV_COM | 1 |
| 13 14295 | Q BC549B N SS TO92 030A1 | 2 | 13 4124 | U 082 TL DIP8 POPAMP | 1 |
| 13 14651 | Q BF245B FN SS TO92 03006 | 1 | 13 4222 | U 1495 MC DIL14 P | 1 |
| 13 1491 | Q BSX20 2369 N SS TO18 015A2 | 1 | 13 7397 | U 4013B DIP14 PFL_FL | 1 |
| 13 1621 | D S 1N4148 075150 DO35 | 11 | 13 7552 | U 74HCT123 DIP16 PMULTV | 1 |
| 13 16361 | D Y BAT85 030200 DO35 | 6 | | | |
| 13 1637 | D R BA158 600400 DO7 | 1 | 31 3276 | J MD1 MBT P10 R1SN | 1 |
| 13 1639 | D S BAX12 090400 DO35 | 1 | 31 33921 | J MD JMP P 1 E1SN | 1 |
| 13 1704 | D STB 2V8 0W4 C DO7 | 1 | 31 3947 | J CT MBS P 7 M2SN | 1 |
| 13 2833 | U 76013 SC DIP28 PD_POT | 3 | 31 3949 | J CT MBS P 9 M2SN | 1 |
| 13 2910 | Q BS170 FN SS TO92 060A5 | 1 | 31 3952 | J CT MBS P12 M2SN | 1 |
| 13 2944 | Q BCY87 2N SS TO71 040A2 | 1 | | | |

Spare parts Orbiting module 76 2268U

| ART NO. | DESCRIPTION | QUANTITY | ART NO. | DESCRIPTION | QUANTITY |
|----------|--------------------------|----------|----------|-------------------------|----------|
| 13 1411 | Q BC549C N SS TO92 030A1 | 1 | 13 7600 | U 4052B DIP16 PM/DEM | 1 |
| 13 14181 | Q BC559B P SS TO92 030A1 | 3 | 31 3943 | J CT MBS P 3 M2SN | 1 |
| 13 1621 | D S 1N4148 075150 DO35 | 8 | 34 84071 | CD CT FWT MBS P 7 L 110 | 1 |
| 13 2832 | U 8574A PCF DIP16 PEXP | 1 | | | |
| 13 2833 | U 76013 SC DIP28 PD_POT | 1 | 36 20216 | SCR D84 M 3 X 6 SI | 4 |
| 13 2916 | Q BS250 FN SS TO92 045A2 | 1 | 36 7502 | WSHR D6798 A 3.2 S Z | 3 |
| 13 4028 | U 317LZ TO92 PSTAB | 1 | | | |
| 13 4029 | U 337LZ TO92 PSTAB | 1 | 71 23024 | WSHR D 3.25X 7 T1 L | 1 |
| 13 4113 | U 084 TL DIP14 POPAMP | 2 | 78 0224 | PCD PJ49 800 ORBIT 2 | 1 |
| 13 7303 | U 4066B DIP14 PSWTCH | 1 | 80 3299 | SPR L37 H 5.5 M 3 B | 2 |

